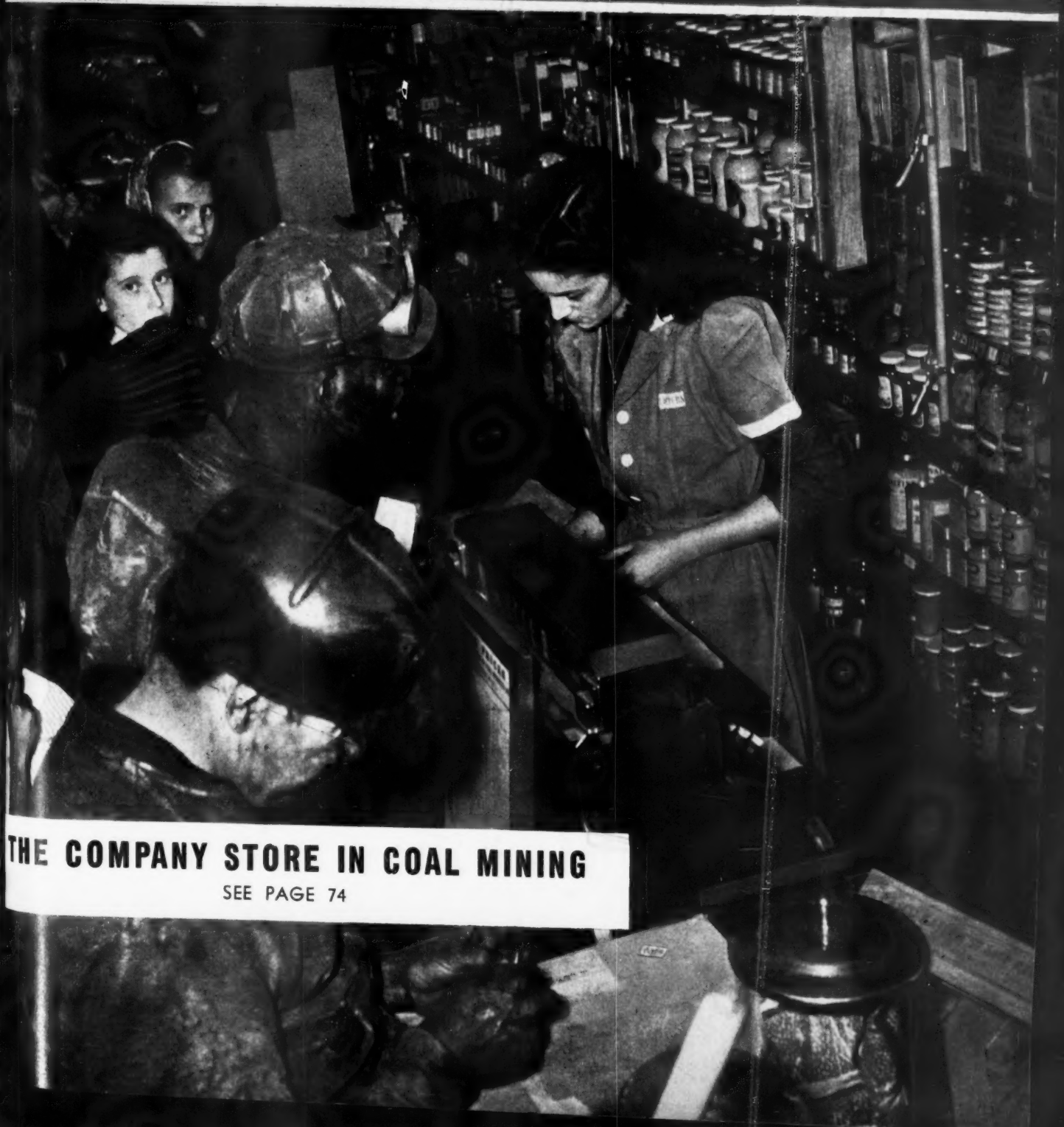
TECHNOLOGY DEPT:

# Coal Age

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DECEMBER, 1944



## THE COMPANY STORE IN COAL MINING

SEE PAGE 74

# Available Again!

# "COALKOTE CBOX"

## Dust-proof your fuels with COALKOTE . . . Safeguard your post-war Sales

Due to war restrictions, COALKOTE has not been available for the past two and one-half years. Now these restrictions have been lifted, and you can again obtain this famous dust-proofing treatment.

Before the war, many of the leading producers had adopted the COALKOTE method as a means of protecting their markets, developing new sales and building good will. Millions of tons of coal, coke and briquettes were treated annually with COALKOTE. Consumer acceptance was tremendous. More than 90% of the industry acknowledged that the demand for dust-proofed fuel was increasing rapidly.

COALKOTE is sprayed on the fuel and forms a long-lasting, non-corrosive film which effectually seals the surface of each piece of fuel. This prevents dusting . . . reduces dirt and smudge . . . and, in addition, improves the burning qualities of the fuel.

COALKOTE dust-proofing offers a proved way to protect the new markets you have gained . . . to safeguard your post-war sales. Complete information on COALKOTE'S "Sealed Protection" . . . the modern dust-proofing treatment . . . may be obtained promptly by writing to . . .

**SUN OIL COMPANY • Philadelphia 3, Pa.**

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUNOCO

**SUN INDUSTRIAL PRODUCTS**

*HELPING INDUSTRY HELP AMERICA*

TECHNOLOGY DEPT.




# Pipes gulp acid water to save a coal mine

*A typical example of B. F. Goodrich development in rubber*

AT THIS mine in Maryland there's good coal—450 feet down—but even more water. A few years ago they almost lost the mine—the pipes, for pumping the water out, had corroded, because the water contains acid, and in three days enough water could pour in to flood the underground pumps and lose the mine for months—make salvage almost impossible.

The mine owner had heard that chemical plants use pipe lined with B. F. Goodrich rubber to handle strong acids. He investigated, bought the same pipe, and has never been in danger of losing his mine since. Metal pipe used to last 7 months; the B. F Goodrich pipe has now been in use 48 months and is as good as new. In that time it has handled more than 10 billion gallons of acid water

Many B. F. Goodrich developments, made for one industry, are applied as this was to an entirely different field with equally good results. Research is continuous at B. F. Goodrich, and applies to every kind of rubber product, new or old. No product is too standardized to be improved or changed to meet changing needs of users. B. F. Goodrich distributors can tell you about those improvements in products your company already uses or *might* use. If you don't know the name of the distributor nearest you, write direct about any problem you have that rubber might solve. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

**B.F. Goodrich**

RUBBER *and* SYNTHETIC *products*

# TO DO ONE THING...

# and do it



In 1832, Samuel F. B. Morse did away with distance and eliminated space between points to revolutionize business, when he invented the telegraph. His invention ended years of experiment, resulted in an instrument that was to save countless hours and speed messages and be of invaluable help to the world of business.

A quarter of a century ago at Philadelphia, Hulburt produced a Quality grease for coal mine lubrication. This new product was so successful that Hulburt has specialized in coal mine lubrication ever since. Today, in every coal field in this country, HULBURT QUALITY GREASE is used wherever efficiency and low cost per ton is demanded.

**HULBURT OIL & GREASE COMPANY . . PHILADELPHIA, PENNA.**

*Specialists in Coal Mine Lubrication*

*supremely well!*




# HULBURT *Quality* GREASE

# New Government Ruling Releases Dust-proofing Material

## Operators now able to offer extra service to consumer and protect future sales with "Coalkote CBOX"

In April, 1942 petroleum products for use in the dust-proofing of coal were withdrawn from the market by Petroleum Distribution Order No. 13 issued by the Petroleum Administration for War. Accordingly, "Coalkote" has not been available since that date.

*On October 21, 1944 this order was amended to permit the sale of these products.* Effective immediately, "Coalkote CBOX" is available, in any quantity, for the dust-proofing of coal and coal products.

### *Millions of Tons Previously Processed*

Prior to the withdrawal of this product from the market in 1942, millions of tons of coal, coke and briquettes had been processed with "Coalkote." Coal executives, alert to the competition of oil and gas, discovered that dust-proofing their product not only helped to retain many old customers, but also gained new markets. They discovered that it was not only practical to dust-proof the domestic sizes of coal, but also that by treating stoker sizes new markets became available.

Not only does the spraying of coal with "Coalkote" make it practically dust-proof, it also steps up the burning qualities of the fuel. It minimizes the segregation of fines in stoker coal, giving a more even fuel bed and eliminating blowholes. These are but a few of the *many* advantages which coal producers have discovered in the use of "Coalkote."

In an impartial survey of coal producers conducted several years ago over 90% acknowledged that public acceptance and demand for dust-proofed fuel was rapidly increasing.

### *Protects Future Sales . . . Goodwill*

The coal industry has gained much ground in the past three years. It behooves the entire industry to exert every possible effort to safeguard these gains. Dust-proofing is one tried and proved means of winning and holding the goodwill of both old and new domestic users of coal, coke or briquettes. Cleanliness is a sales argument which is particularly appealing to the average housewife and which has been used with telling effect by competitive fuels.

"Coalkote" offers you a way to meet this argument successfully. *Now* is the time to put "Coalkote" to work for you . . . *not* after you have lost customers through reconversion to other types of fuel.

### *Easily Applied . . . Low Cost*

"Coalkote" is easily applied with the proper equipment to make the oil sprayable. The oil is usually sprayed on the fuel as it is loaded into the freight cars. As the coal tumbles, all sides of each piece come in contact with the spray. The equipment required is comparatively simple and the entire cost of the process is low in comparison with the sales advantages which it offers. Complete information will be supplied promptly upon request.

Write to . . .

**Sun Oil Company, Philadelphia 3, Pa.**

Coal Age

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**McGRAW-HILL PUBLISHING COMPANY**
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**Please change my address on COAL AGE**

**FROM** .....

**To** .....

**SIGNED** .....

# Piping materials for any system ...CRANE supplies them all

## ONE SOURCE OF SUPPLY...ONE RESPONSIBILITY FOR ALL MATERIALS

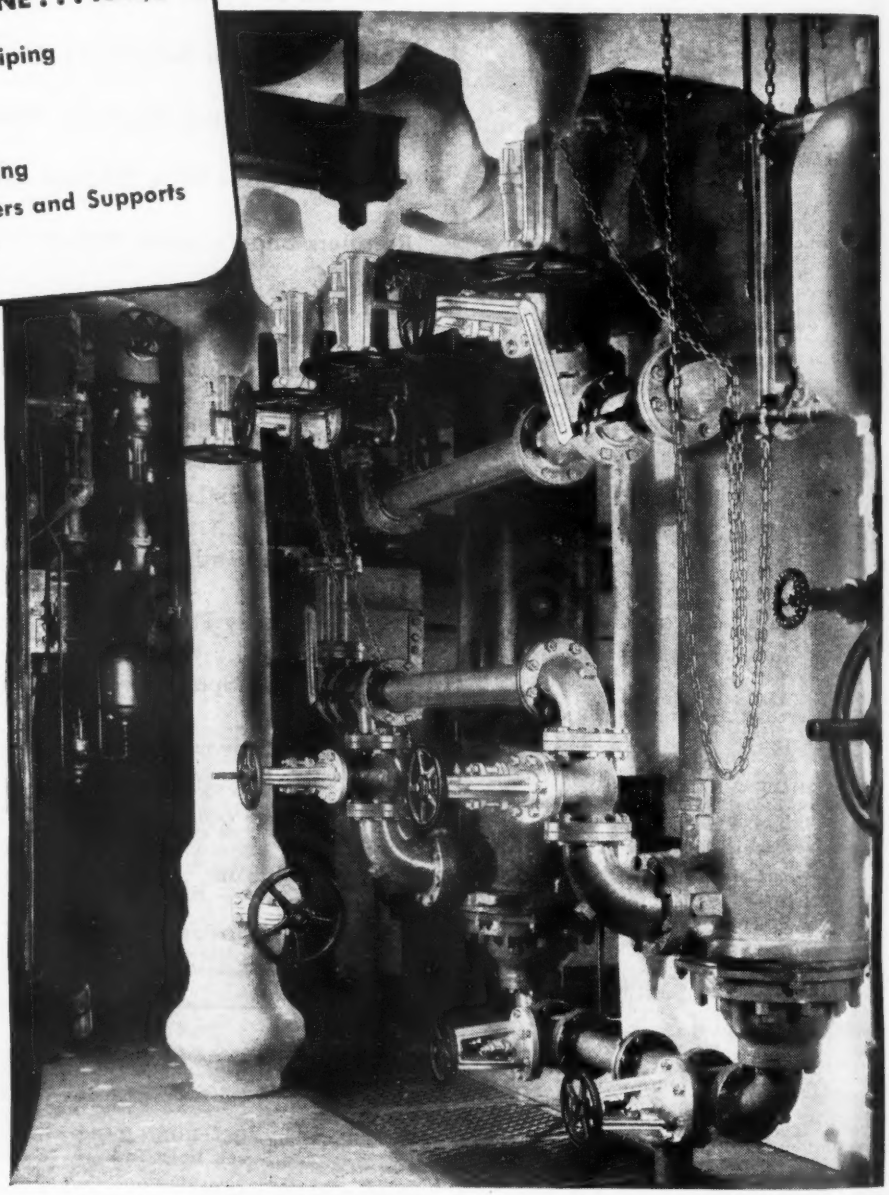
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*Branches and Wholesalers Serving All Industrial Areas*

**PIPING EQUIPMENT BY CRANE...100%**

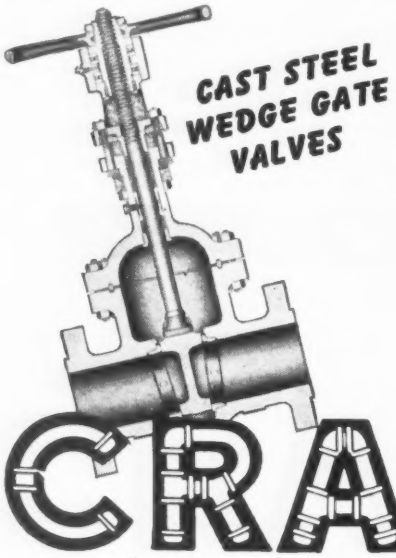
- Gate Valves
- Globe Valves
- Check Valves
- Screwed Fittings
- Flanged Fittings
- Pipe
- Fabricated Piping
- Unions
- Flanges
- Pipe Covering
- Pipe Hangers and Supports
- Separators



*Installation in Industrial Power Plant*

### ONE STANDARD OF QUALITY

The same high quality protects every part of piping systems when Crane materials are used throughout. In Crane Steel Gate Valves, for example, straight-through ports permit unrestricted flow. Severest line stresses are overcome by sound and rugged body castings. Smooth operation is maintained by a ball joint type stuffing gland, strong tee-head disc-stem connection, and ample stem bearings. Positive seating is assured by extra long disc guide ribs.




**CRANE**

**VALVES • FITTINGS • PIPE**
**PLUMBING • HEATING • PUMPS**




## CUTS COSTS—AND CLEANER HOLES!

See how much *smoother* it is than conventional hand-welded augers. That's due to the exclusive *automatic* Spir-L-Weld process perfected by Coalmaster engineers.

But the picture can't show all the other advantages it brings you: Superior strength • Reduced resistance — Requires less power • Conveys without clogging • Easier to clean.

In short — the Spir-L-Weld Auger makes Coalmaster drilling even *more* efficient. You save substantially in manpower, time and cost when you specify. . . .

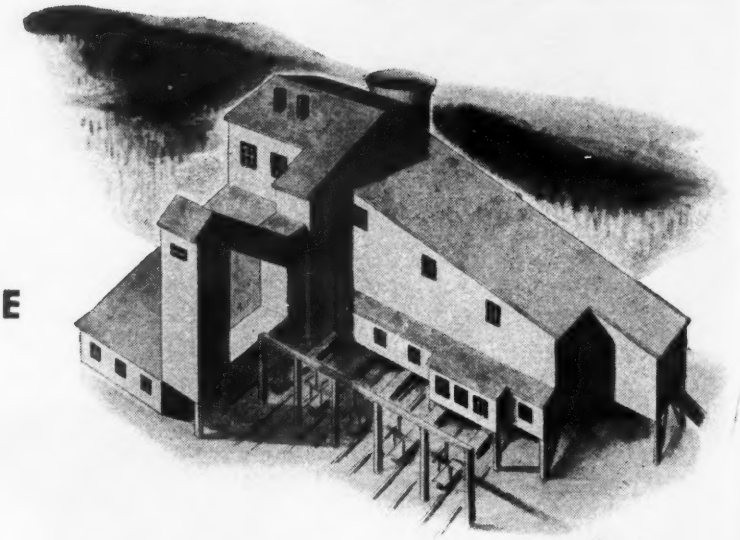
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COALMASTER
TOOLS

**CENTRAL MINE EQUIPMENT CO.**
ST. LOUIS 8, MO.

LET

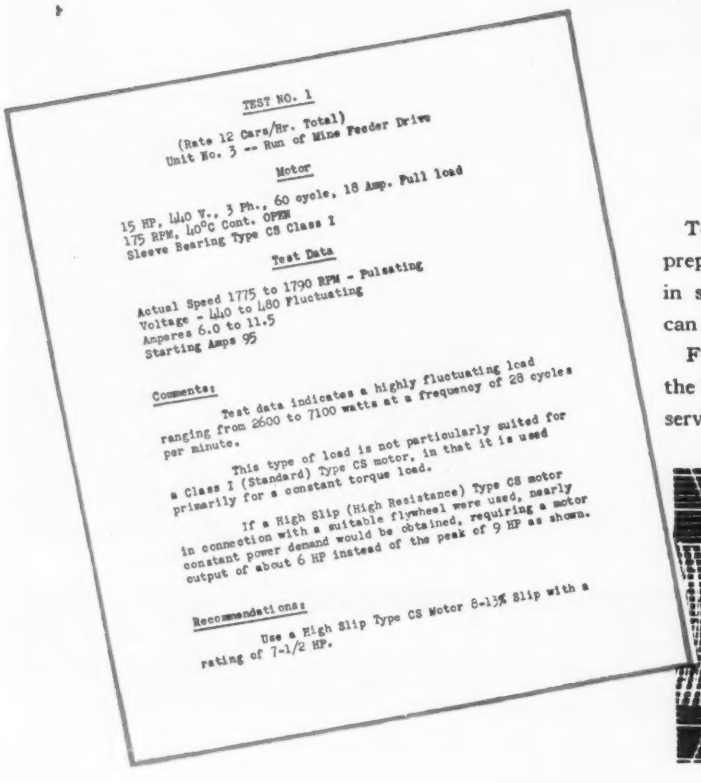
WESTINGHOUSE PRESCRIBE

FOR YOUR



*Coal preparation problems*

Here's a dependable prescription for a healthy efficiency curve in your preparation plant—***Westinghouse electrical equipment***. You'll get factory-built and tested apparatus, specifically designed and engineered to give maximum efficiency under all operating conditions. Thanks to unit design, construction work will be reduced to a minimum. You'll have fewer engineering problems, too—the result of proper selection, based on the recommendations of Westinghouse engineers.



TEST NO. 1

(Rate 12 Cars/Hr. Total)
Unit No. 3 -- Run of Mine Feeder Drive

Motor

15 HP, 440 V., 3 Ph., 60 cycle, 18 Amp. Full load
175 RPM, 40°C Cont. OPEN
Sleeve Bearing Type CS Class I

Test Data

Actual Speed 1775 to 1790 RPM - Pulsating
Voltage - 440 to 480 Fluctuating
Amperes 6.0 to 11.5
Starting Amps 95

Comments:

Test data indicates a highly fluctuating load ranging from 2600 to 7100 watts at a frequency of 28 cycles per minute.

This type of load is not particularly suited for a Class I (Standard) Type CS motor, in that it is used primarily for a constant torque load.

If a High Slip (High Resistance) Type CS motor in connection with a suitable flywheel were used, nearly constant power demand would be obtained, requiring a motor output of about 6 HP instead of the peak of 9 HP as shown.

Recommendations:

Use a High Slip Type CS Motor 8-13% Slip with a rating of 7-1/2 HP.

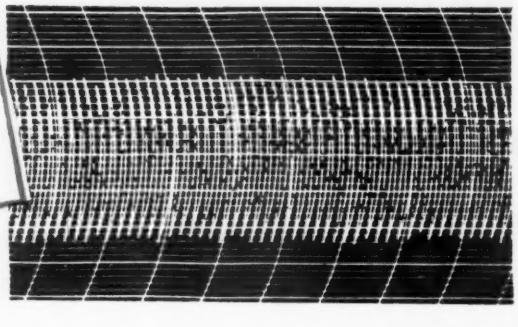
Equally important—responsibility for the proper functioning of your apparatus rests solely with *one* manufacturer. Westinghouse builds *all* the electrical and motive equipment needed to meet your complete requirements.

Westinghouse *alone* can offer you this undivided responsibility for the *design, manufacture, installation* and *performance* of your preparation plant electrical equipment. Westinghouse field service men are available to help you, and maintenance and repair shops are located conveniently throughout the mining districts. For complete information, call your nearest Westinghouse representative. Westinghouse Electric & Mfg. Co., P. O. Box 868, Pittsburgh 30, Pa.

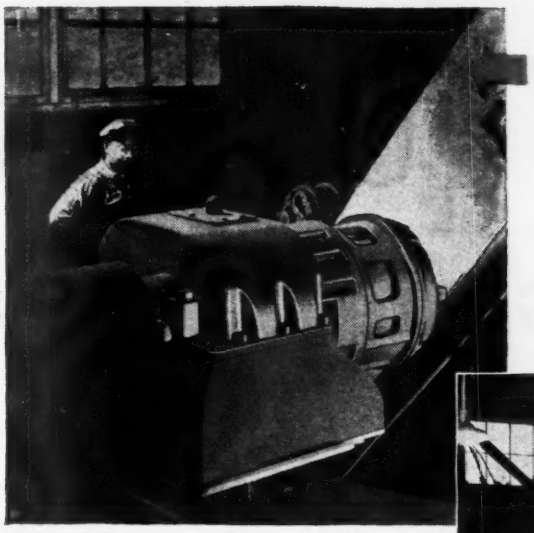
## WE KNOW THE PROBLEMS

To prescribe the correct solutions for the electrical problems of each preparation plant requires a specialist, trained by years of experience in solving similar problems. That's where Westinghouse engineers can help you.

For example, here's a typical actual problem—a motor drive—and the Westinghouse prescription, based on a field test by a Westinghouse service engineer.



WESTINGHOUSE



**MOTORS AND GEARMOTORS**
Selection of the correct type and size for each individual function is important to successful over-all production. There's a Westinghouse motor and gearmotor to fit every application —and each conforms to the rigid Westinghouse specifications.



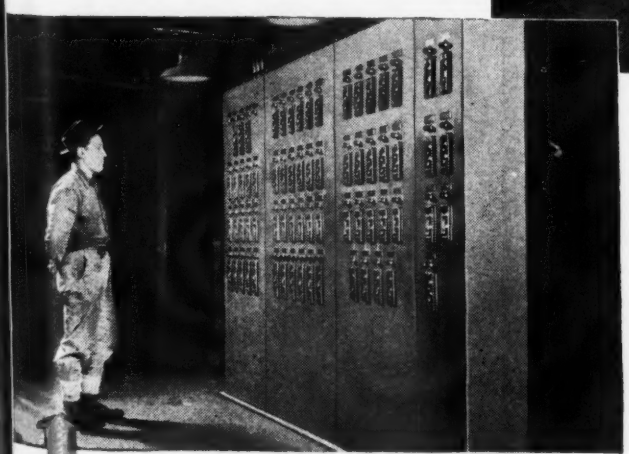
# HERE ARE THE ANSWERS

The electrical apparatus in your coal preparation plant is important. Upon it depends the efficient, economical operation of the entire plant. For complete assurance of dependable performance, specify Westinghouse for *all* your requirements.

The Westinghouse line is complete —when you buy Westinghouse, responsibility for the proper functioning of your electrical system rests with one *experienced* manufacturer.



**TRANSFORMERS**—The Type ASL Air-Cooled Transformer is particularly recommended for use in coal preparation plants. It is free of hazard to apparatus or workmen; no vault is required. Danger from fire or explosion is completely eliminated; no liquids of any kind are used. Air cooling by natural-draft circulation through the housing and coils insulates the low and high-voltage windings.



**CONTROLS**—Localizing of controls for the entire plant in a single, conveniently located push-button control station is an outstanding Westinghouse development for greater plant efficiency and safety. All push-button stations, indicating lights and transfer switches, are mounted on the front panel of a completely metal-clad enclosure. Vertical construction entirely eliminates the dust hazard always present with bench-type or angle mountings.

**POWER CENTERS**—Mounted in one complete factory-assembled unit, the Westinghouse Power Center consists of a high-voltage section, throat-connected through an ASL Transformer to a similar metal-clad, low-voltage Control Center, from which point power is distributed for the entire plant. Economy, safety, compactness and ease of installation, operation and maintenance are distinguishing characteristics. J-94644

**Westinghouse**
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

*Electrical Equipment for the Mining Industry*

# To help you judge

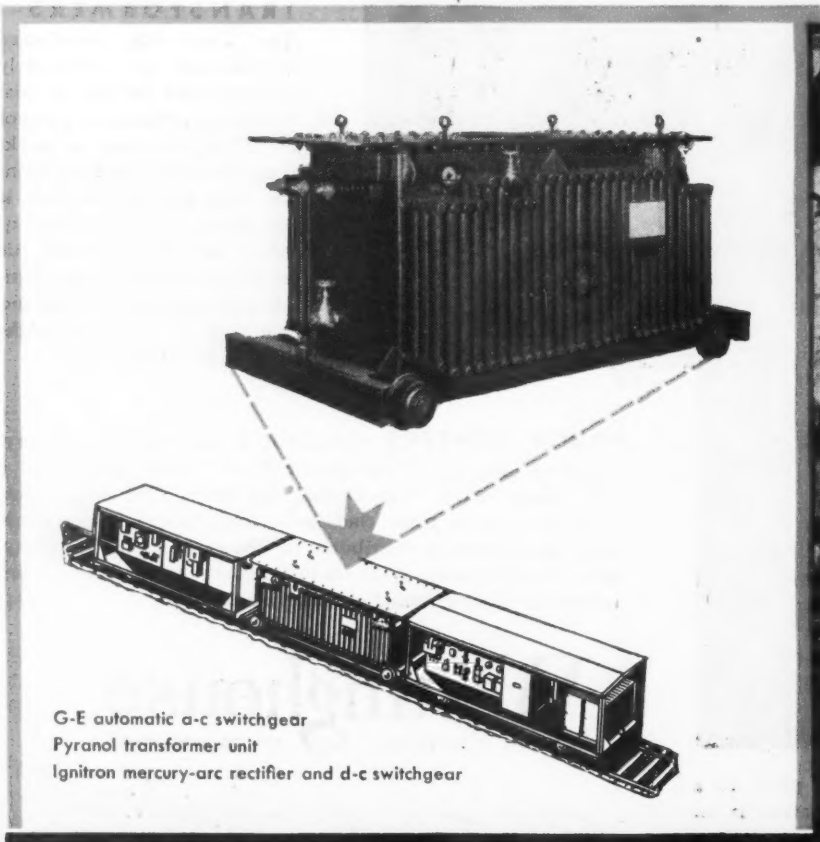
## WE SUGGEST 6 QUESTIONS FOR MINING MEN TO ASK

Underground installation of electric equipment calls for careful analysis of many requirements. When it comes to transformers, for example, you want to know about safety, fire hazard, and the various factors which determine reliability and long-range economy. To aid your choice of transformers for mine service, G.E. offers the check questions on the opposite page.

General Electric, the largest manufacturer of transformers of all types, recommends Pyranol* units for underground service. The reasons, given on the opposite page, are based on twelve years of experience in building more than four million kva of this type.

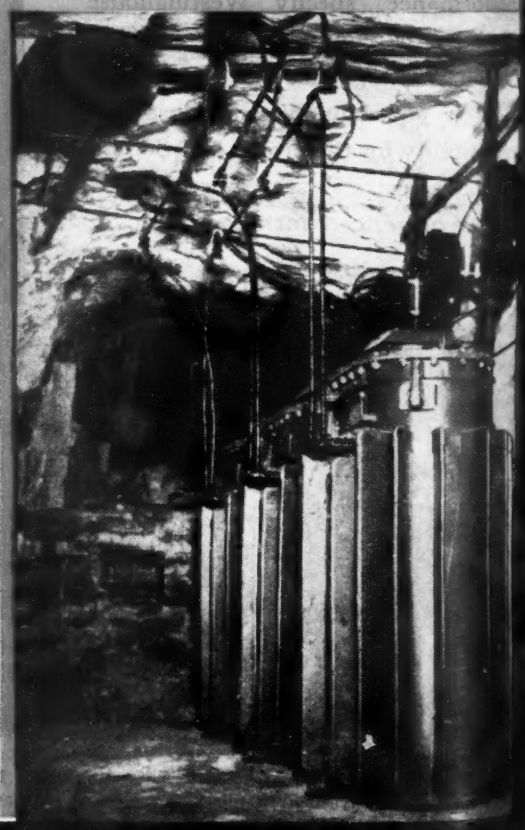
G-E engineers will gladly assist you with more detailed data on transformer application as well as on other phases of mine electrification—locomotives, motors, switchgear, rectifiers, and the rest. Call on them via the G-E office in your area. *General Electric Co., Schenectady 5, N. Y.*

*Trade-mark Reg. U.S. Pat. Off.



G-E automatic a-c switchgear
Pyranol transformer unit
Ignitron mercury-arc rectifier and d-c switchgear

G-E portable underground substations make it practical to convert to direct current thousands of feet closer to the working face, thus avoiding both large voltage drop and excessive copper (in low-voltage d-c feeders)



Installed underground, these G-E transformers are filled with noninflammable, nonsludging, chemically stable Pyranol

# TRANSFORMER FITNESS



### HOW LONG WILL IT LAST?

*Pyranol transformers have the lowest failure record of all major electric apparatus. There is ample evidence that they stand up in mining service. Why? Because their windings are protected from dirts and moisture by immersion in a stable liquid of high dielectric strength.*



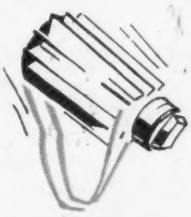
### WHAT IS THE FIRE HAZARD?

*Even if internal arcing should occur in a Pyranol transformer, no fire will develop because "you can't burn Pyranol." No Pyranol transformer has ever burned or contributed to a fire—a record that justifies selection of Pyranol transformers for underground installation.*



### SUPPOSE IT DOES SHORT?

*If a short circuit causes a heavy, sustained arc under Pyranol—i.e., if all usual means of breaking the circuit fail—gas forms, and escapes through a relief diaphragm, and is readily disposed of. This gas is easily detected, and there is no hazard of fire, smoke, or deadly carbon monoxide.*



### WHAT ABOUT FLEXIBILITY?

*The Pyranol transformer is equally suited for your outdoor installations — in rain or snow, or dust-laden wind. In Pyranol units, you get a degree of flexibility unobtainable with any other type of transformer.*



### WHAT SURGE VOLTAGE CAN IT STAND?

*Underground transformers supplied from overhead lines may be subject to lightning surges. The high insulation strength of Pyranol permits adequate protection against damage by use of economical commercial arresters.*



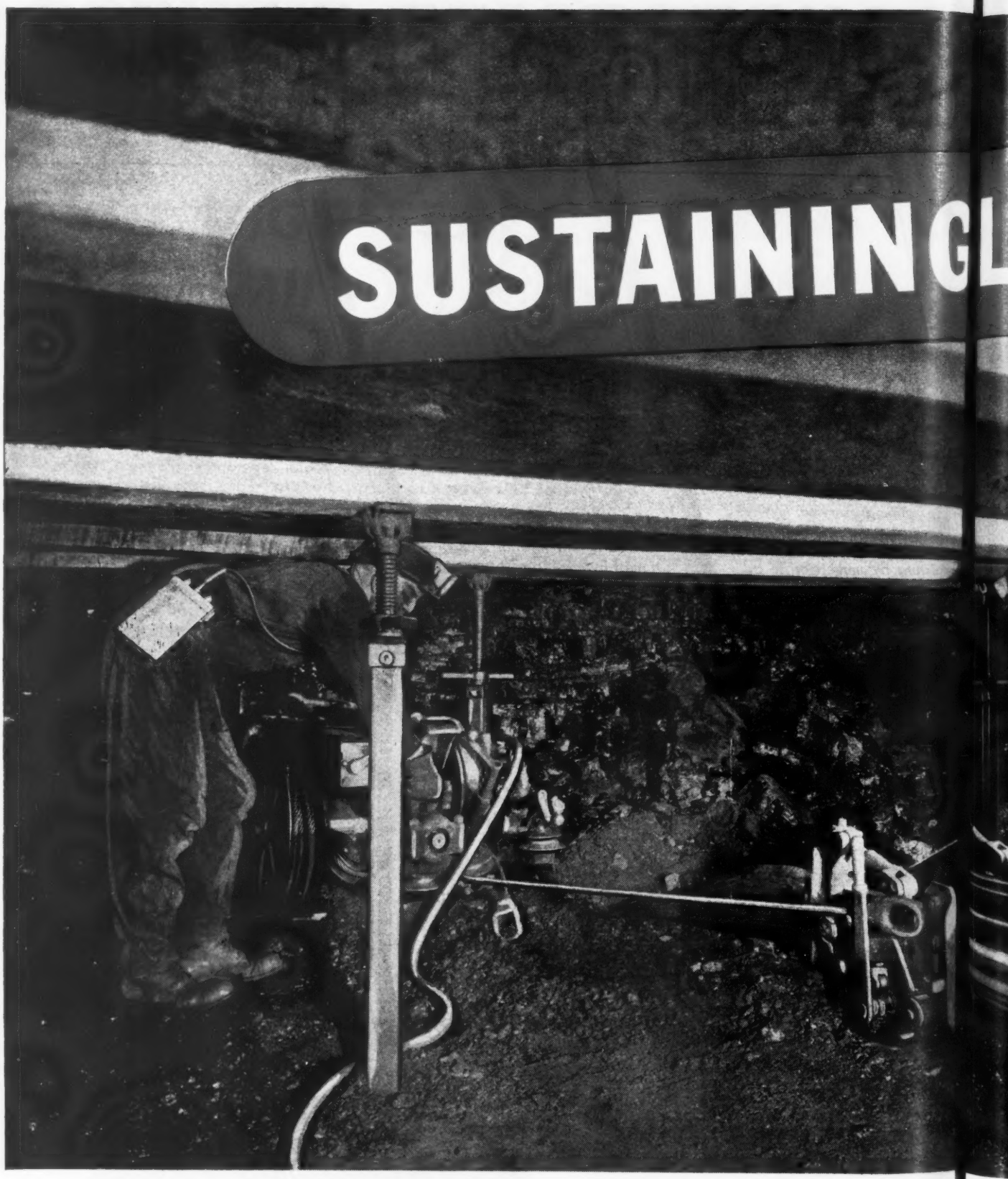
### AND WHAT ABOUT MAINTENANCE?

*Sealed against entrance of moisture and dirt, G-E Pyranol transformers require little maintenance. There's no sludging. The sturdy steel tank provides extra protection from physical damage.*

Buy all the BONDS you can—and keep all you buy

GENERAL ELECTRIC

PYRANOL TRANSFORMERS




TEXACO

REG. T. M.

TEXACO LUBRICANTS



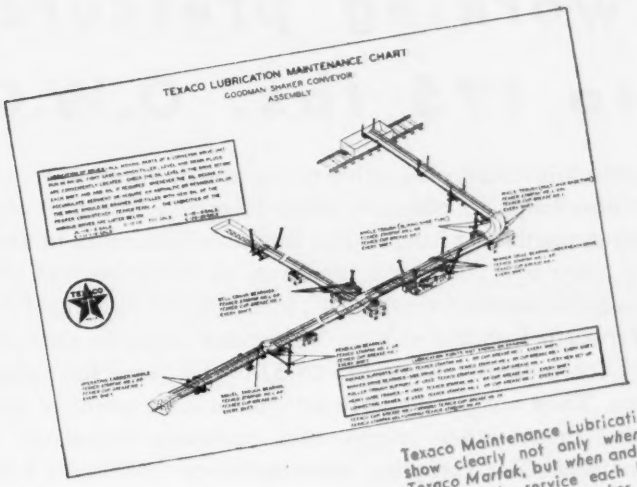
# GLOAD-OUT SPEED!

WITH RECORD QUOTAS still to be met, every operator knows the importance of maintaining a continuous flow of coal from face to car-loading point . . . knows that this steady movement depends on smoothly functioning mine machinery . . . machinery *effectively lubricated!*

That is why, to assure long, trouble-free operation from their equipment, operators everywhere rely on the proved effectiveness of Texaco lubricants.

*Texaco Marfak,* for example, in both anti-friction and plain bearings of shaker-conveyors, cutters, loaders, shuttle cars, locomotives, etc., provides ideal film lubrication inside the bearing, yet maintains its original consistency at the outer edges . . . sealing itself in, sealing out dirt and water. Its tough adhesive film cushions against shocks, and makes parts last longer.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, *National Sales Division, Dept. C.* 135 East 42nd Street, New York 17, N. Y.




Texaco Maintenance Lubrication Charts show clearly not only where to use Texaco Marfak, but when and with what lubricants to service each lubrication point in all leading makes of cutters, loaders, locomotives, etc. Order the Charts you need by make and model.

## For the Coal Mining Industry

# FIT THE VALVE TO THE SERVICE

**WALWORTH**

## *Steeliron*

**LUBRICATED PLUG VALVES**

**No. 1796 — SCREWED**
**No. 1797F — FLANGED**



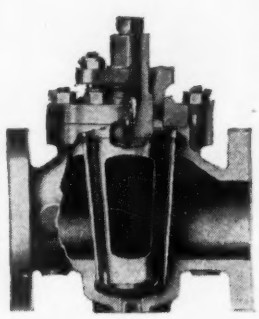

No. 1796

## for working pressures up to 175 lbs. O.W.G.

This Walworth lubricated plug valve meets a wide range of requirements, and also helps to conserve critical copper. Made of close-grained, high strength cast iron, it uses insoluble lubricants to assure tight-sealing, easy operation, and resistance to corrosion and wear. This valve is made in sizes from 1" to 4", with screwed or flanged ends.

Other Walworth Lubricated Plug Valves are made in sizes from 1/2" to 24", for pressures from 125 to 5,000 psi., and for vacuum requirements. They are particularly adaptable for control of gritty solutions and many other erosive and corrosive industrial and chemical solutions. For complete information on Walworth Lubricated Plug Valves, write for a free copy of Walworth Circular No. 91.

Walworth also manufactures a complete line of gate, globe and check valves, as well as pipe fittings and pipe wrenches. Walworth Catalog 42 gives detailed information. Write on your company letterhead for a free copy.



*Just a turn of the lubricant screw on a Walworth Lubricated Plug Valve forces insoluble lubricant under pressure through a grooving system and down beneath the plug. The lubricant seals the valve against leakage in either open or closed position, reduces friction between plug and body, and helps protect plug and body against contact with corrosive line fluids.*

*These are some of the features which make Walworth Lubricated Plug Valves ideal for many "difficult" services.*

ARMY E ARMY E NAVY

BOSTON WORKS
KEWANEE WORKS

**WALWORTH**
**valves AND fittings**
**60 EAST 42nd ST., NEW YORK 17, N.Y.**

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

# A Simple Lesson on Sled Runner Action

## OR WHY TROLLEY SHOES PERFORM BETTER THAN WHEELS

Did you ever notice the actions of a wheel  and a sled runner  as they went over a bump in the road? The wagon wheel bounces. The sled runner glides smoothly. Let's apply this comparison to a trolley wheel  and a trolley shoe . . .  They travel at high speed and hit bumps and hard spots in the overhead. The wheel bounces . . . often dewires.  It arcs and burns bits of copper from the  trolley wire. The shoe glides  smoothly. Its long surface remains in contact with the wire and eliminates  arcing. The trolley wire lasts longer. The collector lasts longer, too. That's the reason  why we recommend the O-B Type L Trolley Shoe as the finest current collector available for mining service . . . Why not install  them on your locomotives and reap the benefits of trouble-free current collection? 

Ohio Brass

MANSFIELD, OHIO

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONTARIO, CANADA

AD 2513M

# *The* GOODMAN DUCKBILL-SHAKER



11949

Coal is loaded quickly and cleanly onto the shaker line by the Duckbill, and is immediately transported to the entry without change of setup.



12417

A smoothly running, high capacity Goodman belt conveyor receives the coal from shaker units and maintains an uninterrupted movement to the mine car.

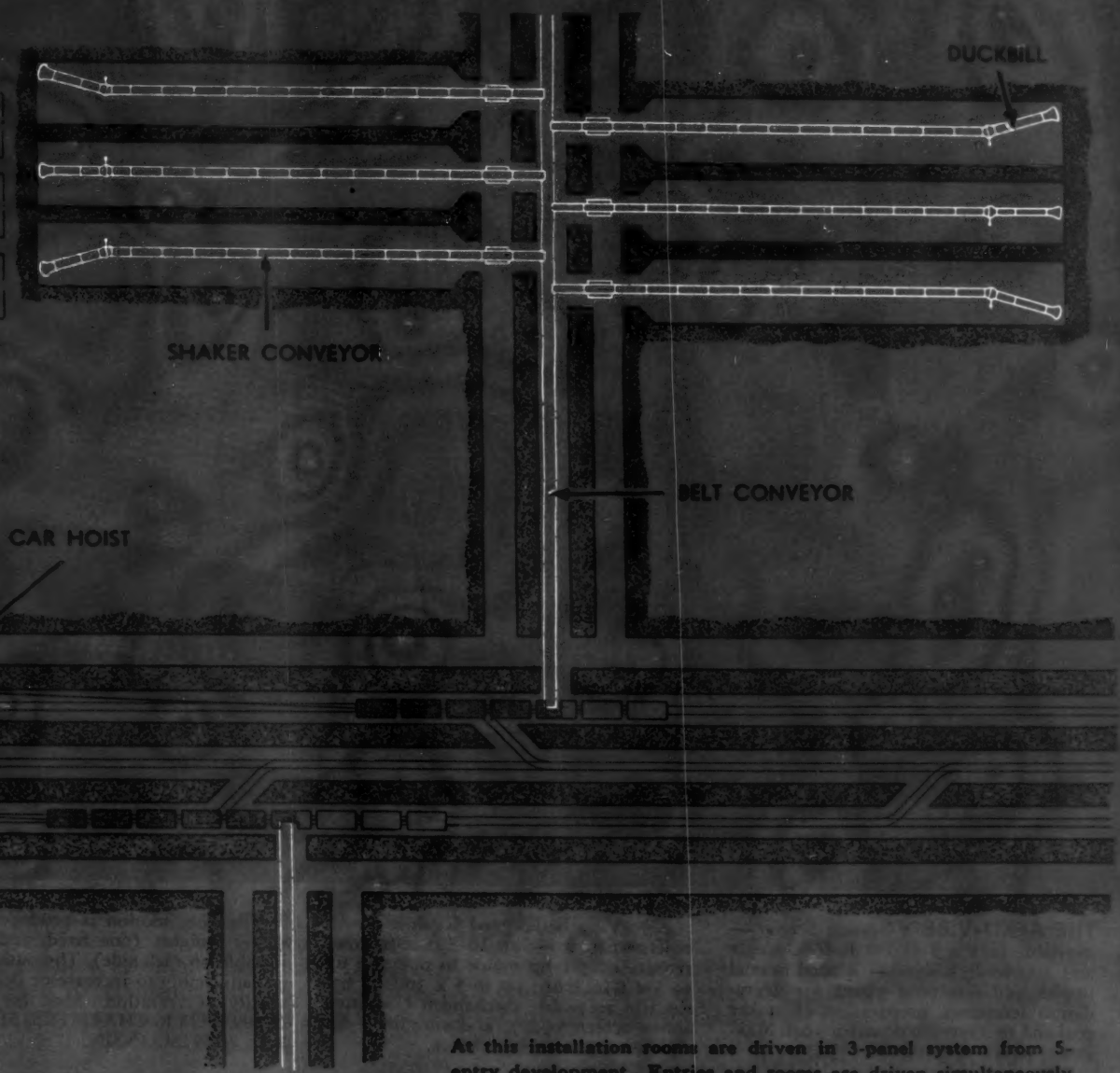



## GOODMAN MANUFACTURING COMPANY

# CONVEYOR SYSTEM OF MINING

. . . combines loading and transporting; promotes continuous development and production; concentrates working areas; has low maintenance cost.

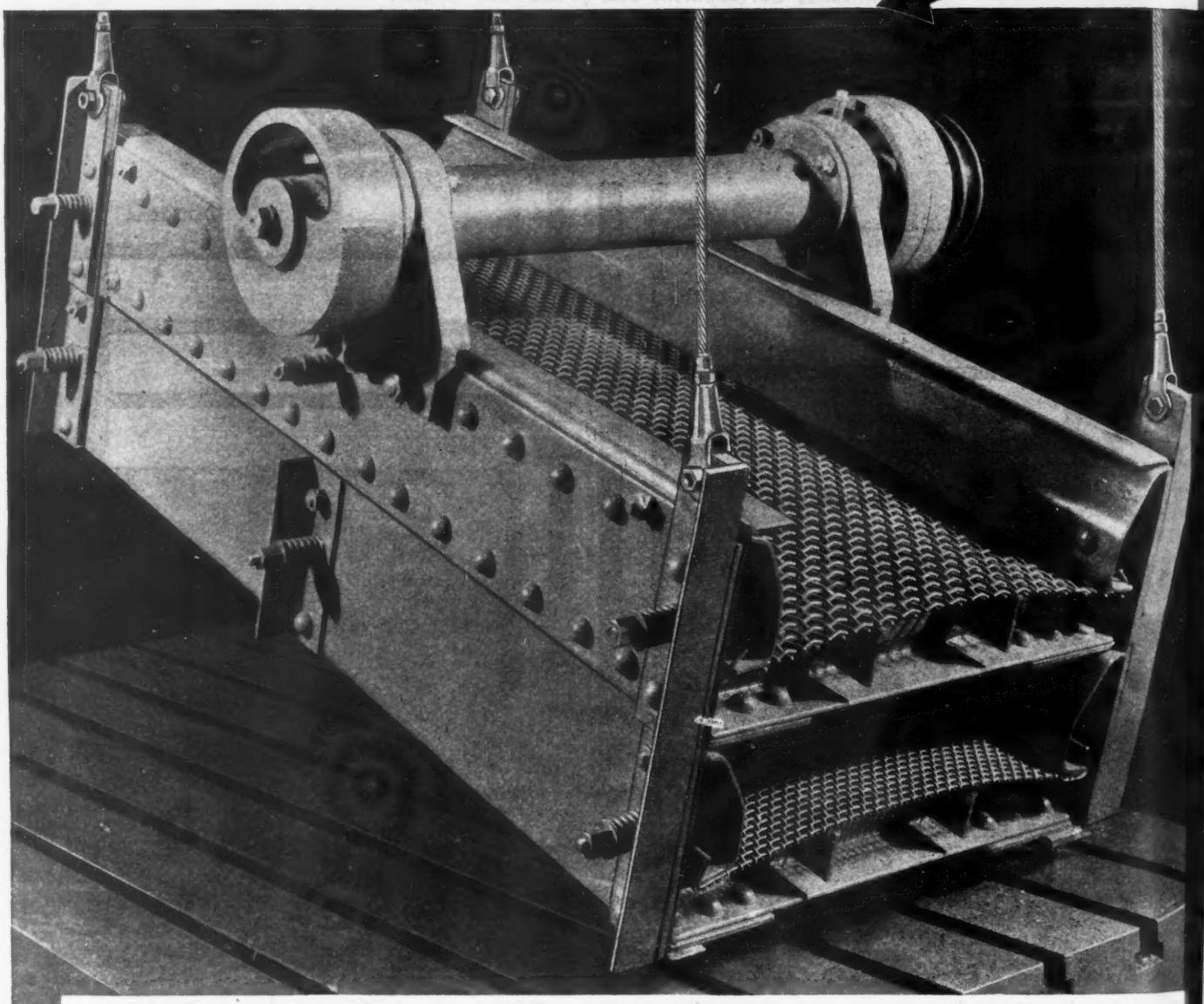
*A Continuous Flow of Coal from Face to Mine Car*




At this installation rooms are driven in 3-panel system from 5-entry development. Entries and rooms are driven simultaneously with Duckbill-Shakers discharging onto belt in center panel entry. It is one plan of many in successful operation that permit full advantage of Shaker Conveyor economies.

**HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS**

# You Buy This...



**THE AERO-VIBE** Vibrating Screen — available in 1 x 3 to 5 x 10-foot, single and double deck sizes — is used in coal tipples and screening plants for degradation screening, preparation of stoker coal and re-screening domestic coal. Maximum screen openings to 1½".

Aero-Vibe is designed for low power consumption — up to 3 x 6-ft sizes require only 1 hp motor to operate; up to 3 x 8-ft, 2 hp; up to 5 x 10-ft, 5 hp. Readily accessible mechanism (mounted above screen body), and simplified design assure low maintenance.

Vibratory-motion is produced by off-center weights (one fixed, and one adjustable on each side). The outer weights are adjustable to increase or decrease intensity of vibration. Send for Bulletin B6099. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

WE WORK FOR VICTORY — WE PLAN FOR PEACE

BASIC EQUIPMENT FOR COAL INDUSTRIES:

ALLIS

Vibrating Screens, all types for Wet or Dry Separation

Electric Motors, Control, Texrope V-Belt Drives

# You Get This!



## 1 COOPERATIVE ENGINEERING

Allis-Chalmers engineers, specializing in coal industry requirements, work hand-in-hand with your own staff or *tipple manufacturer* — look for ways to make *existing* as well as new equipment "team up" to give you greater output at lowest cost.



## 2 PRODUCTION ANALYSIS

There's no guesswork when you specify Allis-Chalmers equipment. Experienced field engineers make their selection of machinery for your mine, tipple, preparation plant or dock on the basis of how it will fit in your *entire* production process.



## 3 UNBIASED RECOMMENDATION

A-C builds many types, styles and sizes of equipment for coal industries. When you need a screen, for example, selection can be made from *four* different types. Recommendation is unbiased — because we supply *exact* equipment you need.




## 4 EMERGENCY PARTS SERVICE

There's no "sell-and-forget" attitude at A-C. With district offices conveniently located in your area, you are assured of *emergency expediting* when replacements or repairs are needed. In most cases, parts are shipped immediately from stock.

# A-C CHALMERS

Full line of Single & Multi-Stage Centrifugal Pumps

Mine Hoists—with automatic "Regulex" control

Crawler & Wheel-type Tractors, Allied Equipment

Circuit Breakers, Unit-Substations, Rectifiers

A 1742

# ATLAS MANASITE DETONATORS

## You Get This EXTRA SAFETY at No Extra Cost!



Faced with labor shortages, many operators—even though they have already adopted many safety measures—are keeping a weather-eye open to any unusual and additional methods that offer protection for their men.

At no extra cost, Atlas Manasite detonators—because they are less sensitive to impact and friction—put extra safety on the blasting job. They provide reliable action, too—millions have been sold since Atlas Manasite detonators were introduced five years ago.

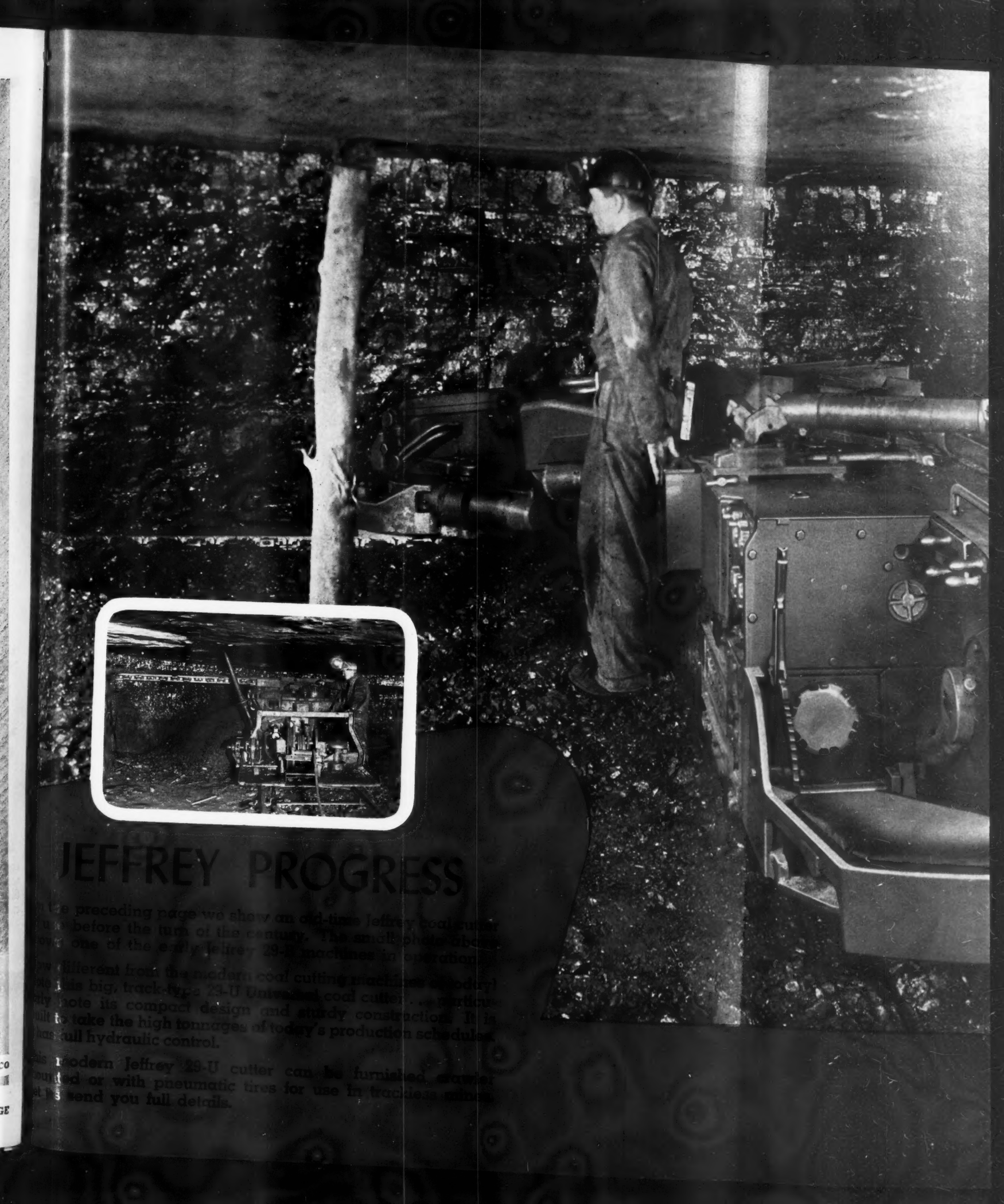
*Put this extra safety to work on YOUR blasting job. Call the Atlas Representative—he'll gladly give you full details.*

Manasite: Reg. U. S. Pat. Off.

**ATLAS** EXPLOSIVES
*"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

**ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address*—Atpowco**



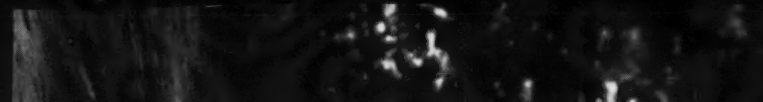
# JEFFREY PROGRESS

In the preceding page we show an old-time Jeffrey coal cutter ... before the turn of the century. The small photo above ... one of the early Jeffrey 29-B machines in operation ...

... different from the modern coal cutting machines exemplified ... is big, track-type 29-U Universal coal cutter ... quickly note its compact design and sturdy construction. It is ... to take the high tonnages of today's production schedules ... full hydraulic control.

... modern Jeffrey 29-U cutter can be furnished crawler ... or with pneumatic tires for use in trackless mines. ... send you full details.





# JEFFREY

## Mechanical Mine Equipment Since 1880



*An Early Jeffrey Track Type Coal Cutter*

BUY WAR BONDS

EY
1880

Cutter

ONDS

# Jeffrey

## SERVES THE INDUSTRY
## BELOW AND ABOVE GROUND
## FROM FACE TO RAILROAD CAR

**CUTTERS**
**DRILLS**
**LOADERS**
**LOCOMOTIVES**
**FANS**
**CONVEYORS**
**BLOWERS**
**JIGS**
**CRUSHERS**
**SCREENS**
**RENEWAL PARTS**

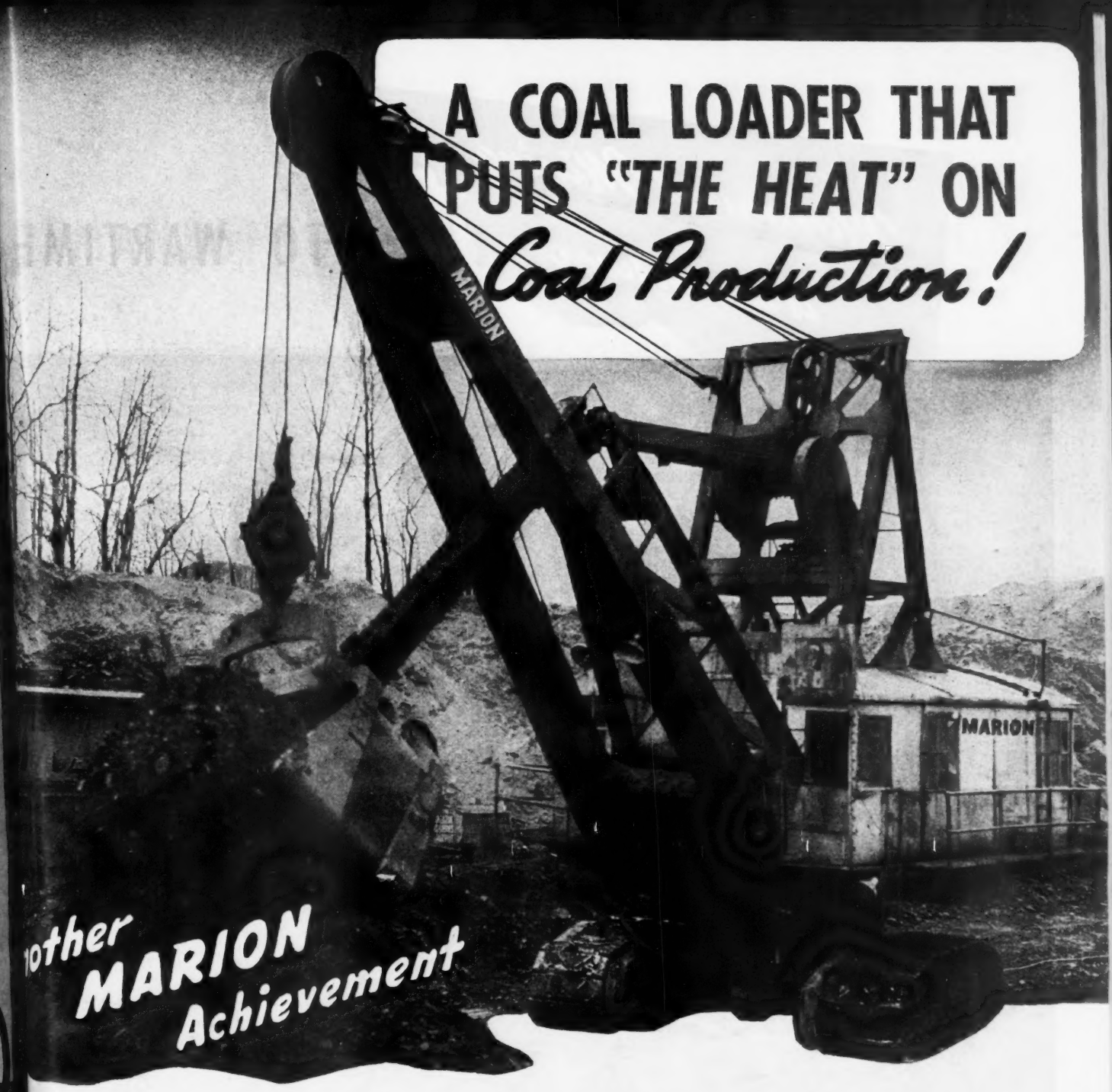
## THE JEFFREY MANUFACTURING COMPAN

*Established in 1877*

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

| | | | | | |
|---|---|---|---|---|---|
| **Sales Offices:** | Baltimore<br>Birmingham<br>Boston<br>Buffalo | Chicago<br>Cleveland<br>Cincinnati<br>Detroit | Denver<br>Harlan<br>Houston<br>Huntington | Milwaukee<br>New York<br>Philadelphia<br>Pittsburgh | Scranton<br>St. Louis<br>Salt Lake |
| **Service Stations:** | Pittsburgh<br>Harlan, Ky. | Birmingham<br>St. Louis | | Logan-Beckley<br>W. Va. | Scran |
| **Foreign Plants:** | Jeffrey Mfg. Co., Ltd.<br>Montreal, Quebec | British Jeffrey-Diamond, Ltd.<br>Wakefield, England | | Jeffrey-Galion (Pty). L<br>Johannesburg, S. A. | |

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# A COAL LOADER THAT PUTS "THE HEAT" ON *Coal Production!*

*Another MARION Achievement*

**A modern "Knee-Action" Coal Loader for use in deep or shallow seams.**

**It has speed—power—wide and level clean-up—a quick filling, fast dumping, 7½ cubic yard coal dipper.**

**It is a record breaker in production.**

**Let MARION help you with your loading problem.**

**THE MARION STEAM SHOVEL COMPANY, MARION, OHIO**

*Modernize with*

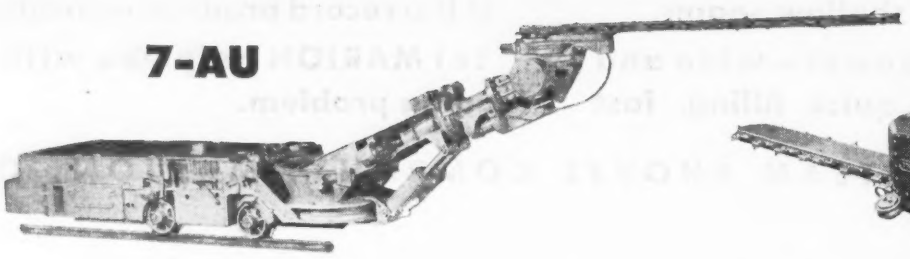
# MARION

SHOVELS • DRAGLINES • CRANES • CLAMSHELLS • WALKERS • PULL-SHOVELS
COAL LOADERS • STRIPPING SHOVELS • GAS • DIESEL • ELECTRIC (From ¾ cu. yd. to 35 cu. yds.)

*Mechanized Mining is the answer* ...TO WARTIME D

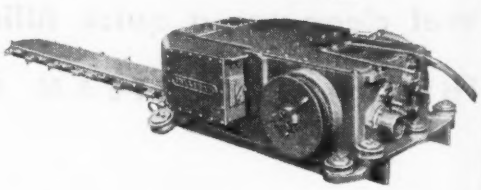


**7-AU**



The Sullivan 7-AU Track Cutter will top cut, center cut, bottom cut, rib shear, center shear, angle cut, slab cut or slab shear. Ample power provided by two motors, one 50 h.p. cutter-chain motor and one 26 h.p. motor for tramming and operating the hydraulic pump.

**7-B**



Because the cutting capacity of the Sullivan 7-B is greater than that of modern loading units, it is particularly suited for mechanized mining. Automatic electric controls, alloy steel gears and shafts, anti-friction bearings and splash lubrication. Has slow-speed, heavy-duty 50 h.p. motor.

*Further details on any of the three Sullivan coal cutters ava*

# E DEMANDS FOR INCREASED PRODUCTION!



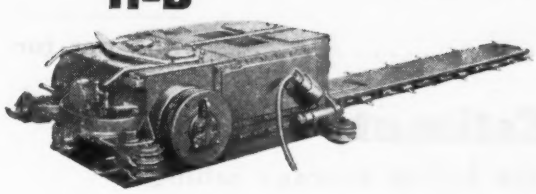
**MECHANIZED MINING** is coal's answer to wartime demands for increased production. Installation of modern, high-capacity machinery has helped immeasurably in the effort to meet tremendous production quotas.

Sullivan coal cutters, because of their efficient, economical operation, have been a prominent factor in the 1944 battle of production, as hundreds of satisfied owners can testify. But more important is the fact that the installation of Sullivan coal cutters is a forward step in building a sound foundation for the future.

The keen competition that is an inevitable part of normal peacetime operation demands the utmost in operating efficiency. One of the surest means of obtaining this goal is through the use of Sullivan coal cutters. Designed for specific types of mining, these cutters will increase production and lower costs because they are built to stay in the mine and on the job.

Further details on any of the three Sullivan coal cutters, the 11-B, 7-B or 7-AU are available for the asking. Sullivan Machinery Company, Michigan, City, Indiana. IN CANADA: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

**11-B**



Designed primarily for conveyor mining, the 11-B is the lowest cutter in its power range which discharges cuttings to the rear. Only 58" long. Controls are easily handled from side or rear of machine. Ideal for working in low coal.

# SULLIVAN

## COAL CUTTERS

ARMY E NAVY

OFFICES —★Birmingham • ★Butte • Chicago • ★Dallas • ★Denver • ★El Paso • ★Huntington • Knoxville • ★Middlesboro • New York • Philadelphia • ★Pittsburgh • Seattle • San Francisco • Salt Lake City • ★Scranton • ★St. Louis. PRODUCTS —Coal Mining Machines • Scraper Haulers • Rock Loaders • Hoists • Car Pullers • Air Compressors • Coal Drills • Rock Drills • Cutter Bit Sharpeners and Heaters • Core Drills and Contract Core Drilling.

★Warehouse facilities at these offices.

*available upon request!*

# EXCITING NEWS!

(This may be exciting to you, but it is the usual stuff for us.)

## Cost Saving On A Big Scale

### FACTS

During three months of 1942 a coal company was operating with 550 rotary dump mine cars of 1¾ tons capacity each (length of sides 8′ 1½″, width 59½″, height 36⅝″). They were handled by two 6-car rotary dumping machines.

These Rotary Cars Were Junked in the Summer of 1942.

During the same three months of 1943 (March, April, and May), they were using 250 S-D 1-2-3 Automatic Drop-Bottom Cars of 6 tons capacity each (length of sides 14′, width 75¼″, height 38″), and two Drop-Bottom incline monitors.

### What Happened?

In 1942 (before the change-over) 138,944 tons of coal were produced in the three months, by 231,147 man-hours of pay-roll.
In 1943 (after the change-over) 188,662 tons of coal were produced in the corresponding months by 241,535 man-hours of pay-roll.

### Namely,

The production of coal per man-hour increased . . . . . 30.02%
The total output of coal per man-hour increased . . . . . 35.77%

### Our Estimate of the Savings Made By Change Over

| | |
|---|---|
| Savings by reducing man-hours per ton equals . . . . . | 30¢ per ton |
| Savings by reducing over-head on 35% greater output equals . . . . . | 8¢ per ton |
| Savings of lower up-keep cost of equipment . . . . . | 5¢ per ton |
| Savings of lower haulage cost, in electricity savings alone . . . . . | 2¢ per ton |
| Total Savings, Our Estimate . . . . . | 45¢ per ton |

### ? What Is Your Estimate ?

(P. S. No consideration is given to the higher average selling-price of the coal due to reduced breakage.)

*Sanford-Day Iron Works* KNOXVILLE, TENNESSEE

# Below Is A Picture Of The Remarkable Car That Produces These Enormous Extra Profits!



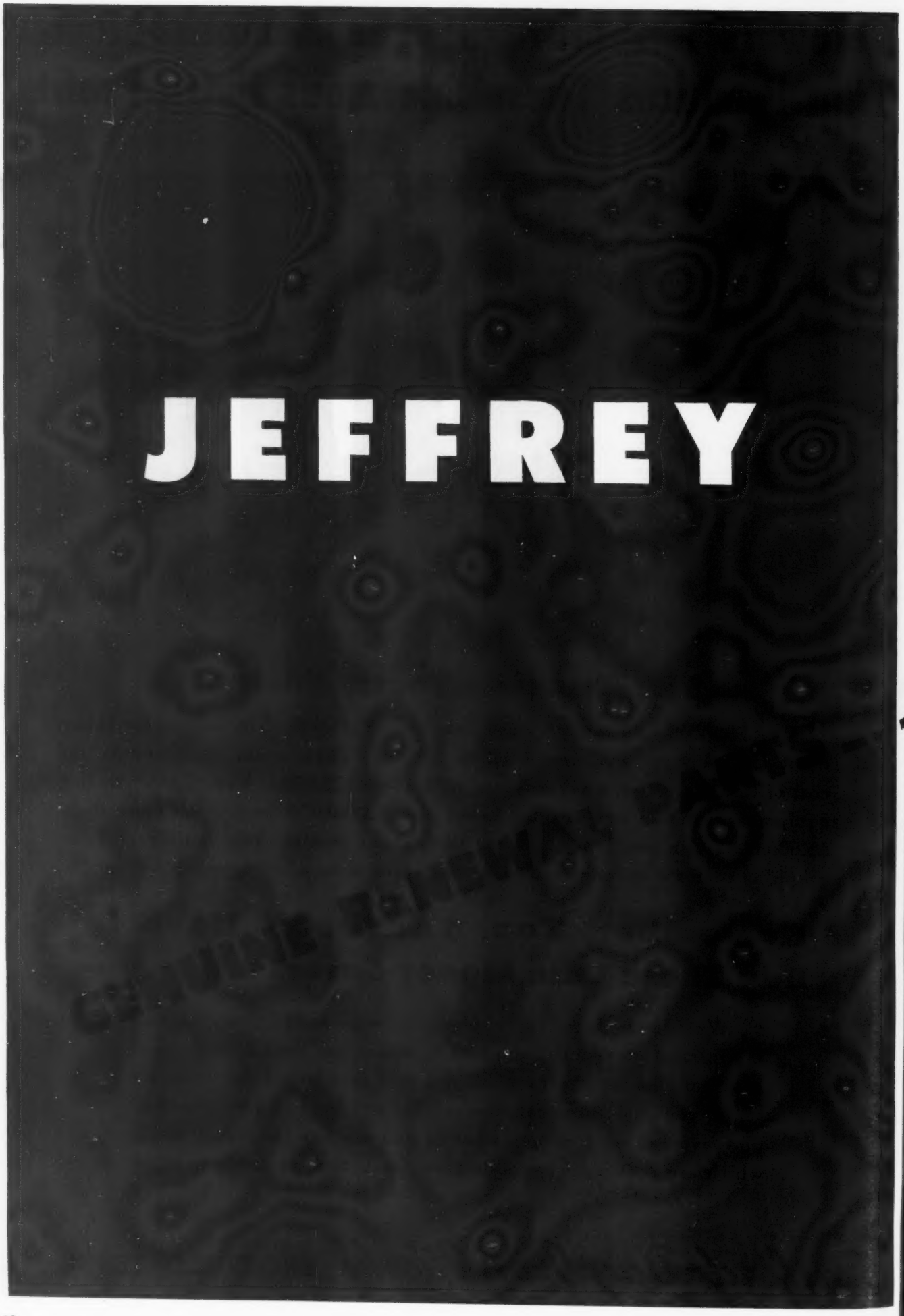
## The Amazing Yearly Saving!

The 250 cars and monitors cost less than $145,000. The saving for three months, at 45¢ per ton, amounted to $84,897. Thus, in six short months the cost of this equipment was recovered with about $25,000 to boot. Each year the equipment (at this output-rate) saves about $340,000, or 6% on more than $5,600,000. Can you hesitate, after this, about writing, telephoning or telegraphing us for a complete plan and proposition on a change-over for you?

## Remember, Too, You Don't Have to Buy These Cute Money-Savers because—

We offer a liberal rental plan. Indeed over 15 years, (counting interest on rentals) the cost to you is less than 2¢ per ton of coal handled by the cars, so you will save about 22 times the rental you pay. How can you ask for anything better than this? Moreover, at any time you want to, you can buy the cars at prices which are reduced by credits given each time rental is paid.

*Sanford-Day Iron Works* KNOXVILLE, TENNESSEE


JEFFREY



# THE JEFFREY MANUFACTURING COMPANY

*Established 1877*

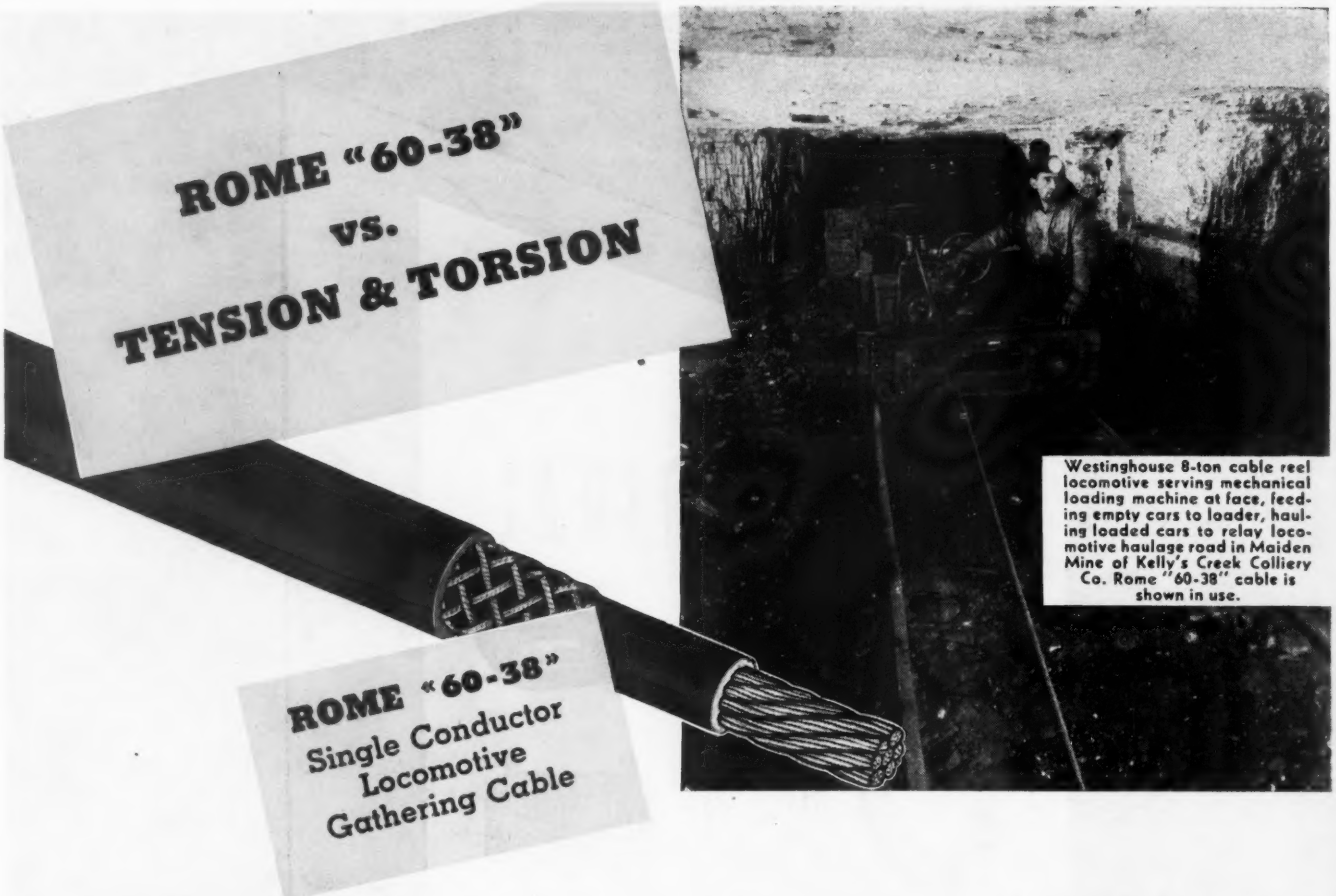
912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

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***WAREHOUSE AND SERVICE STATIONS***

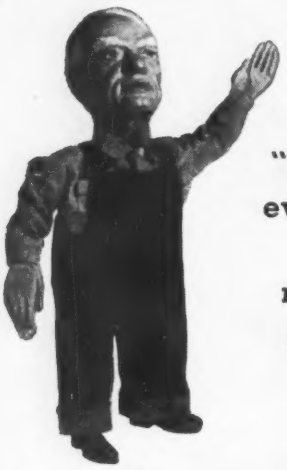
| | | | |
|---|---|---|---|
| BECKLEY | COLUMBUS 16 | LOGAN | SCRANTON 3 |
| BIRMINGHAM 3 | HARLAN | PITTSBURGH 22 | ST. LOUIS 3 |

# ROME "60-38" vs. TENSION & TORSION




Westinghouse 8-ton cable reel locomotive serving mechanical loading machine at face, feeding empty cars to loader, hauling loaded cars to relay locomotive haulage road in Maiden Mine of Kelly's Creek Colliery Co. Rome "60-38" cable is shown in use.

**T**ension and torsion . . . twin enemies of locomotive gathering cables . . . are up against the toughest kind of competition in Rome "60-38" Single Conductor Locomotive Gathering Cables.



"This cable's got everything it takes to stand rough treatment," says *Romey

*Copr. 1944 RCC

**THE CONDUCTOR** is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

**A SPECIAL INSULATION** is used, which has high electrical qualities and extreme adhesion to copper conductor.

**HEAVY TWINE REINFORCEMENT CORDS** are applied over insulation to strengthen the cable and control adhesion between insulation and jacket.

**THE NEOPRENE JACKET** is vulcanized in continuous lead molds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.

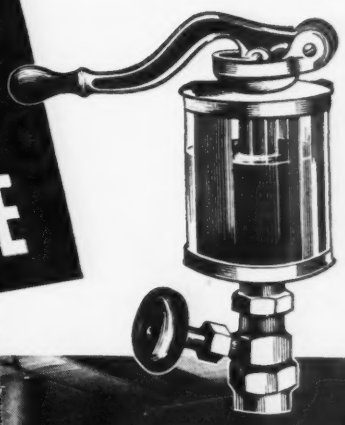
FROM BAR TO FINISHED WIRE

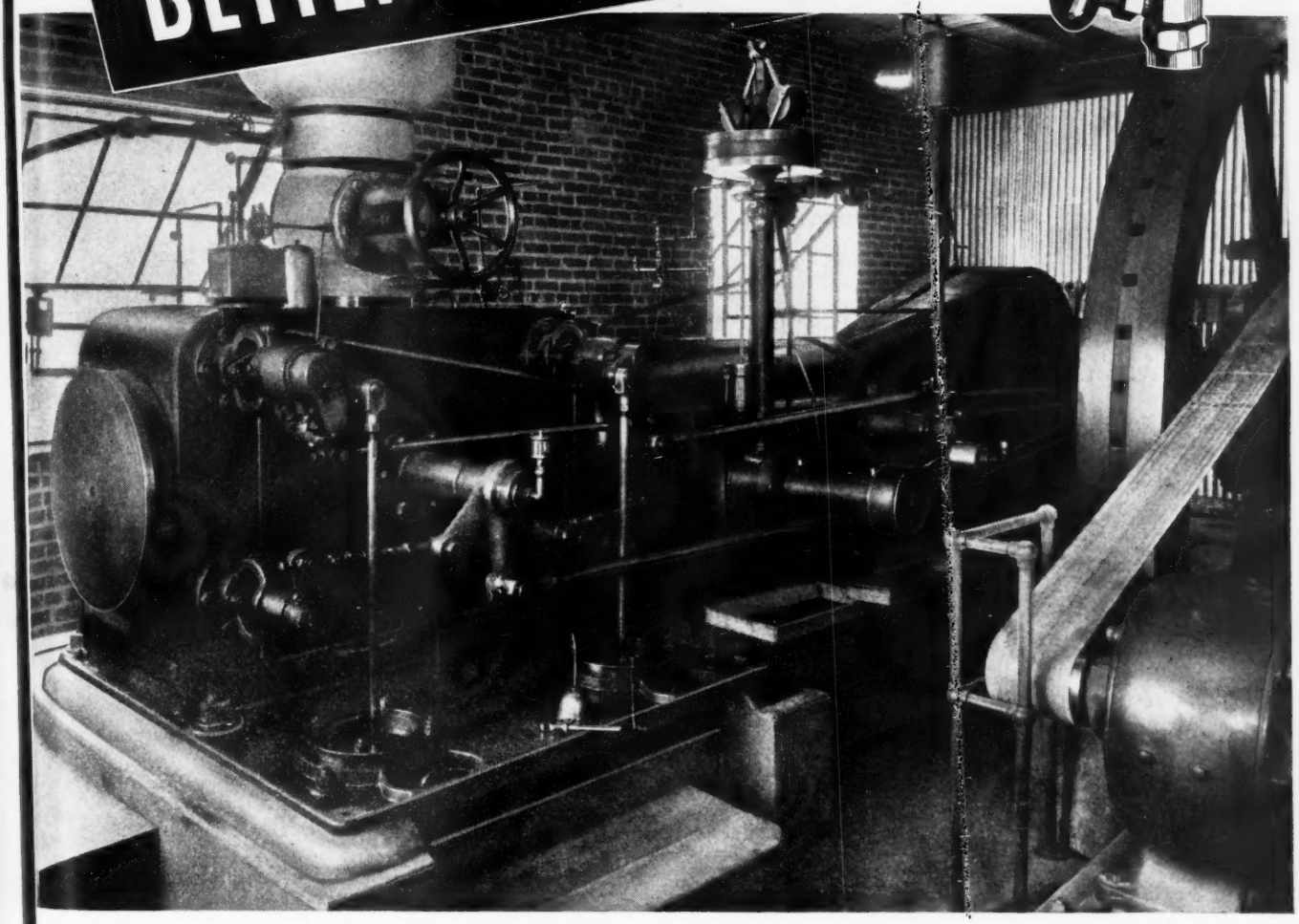
# ROME CABLE CORPORATION

ROME • NEW YORK



# BETTER LUBRICATION *means* BETTER MAINTENANCE





IF you are experiencing difficult maintenance, better check lubrication. It may be inadequate with resultant excessive wear.

Sinclair offers better lubrication for better maintenance. Sinclair STEAM CYLINDER and VALVE OILS correctly meet all combinations of speed, pressure, temperature, and moisture conditions. They promote continuous full load operation.

• • •

*(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)*

## SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

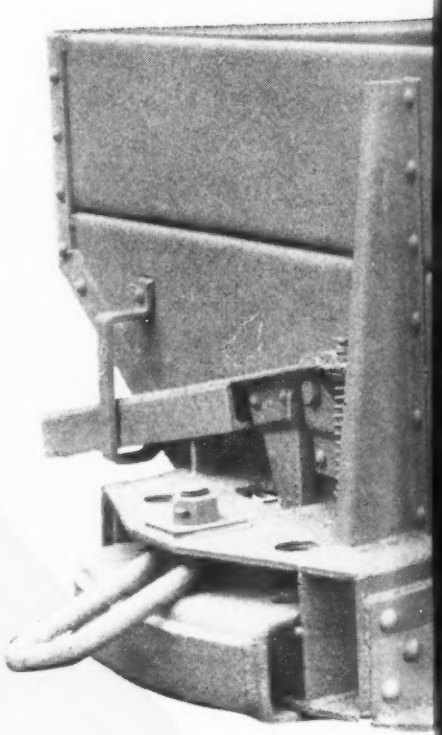
# Any way

a.c.f. Automatic Drop Bottom Mine Cars are more in demand today than ever before. The OVER-ALL REASON is that these cars reduce the cost of coal produced.

Train loads of coal move smoothly over the unloading hoppers, continue without interruption and return to the mines at point of loading. This continuous operation makes for lowest possible cost.

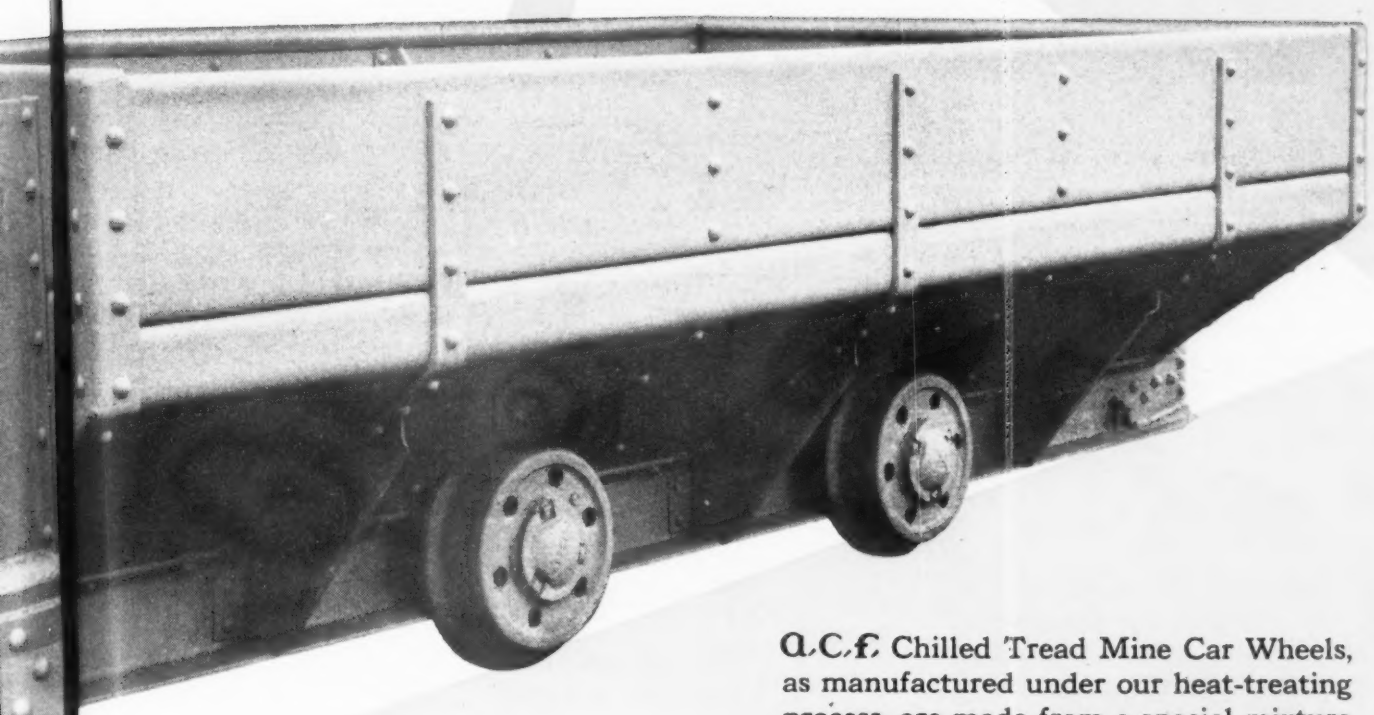
The car shown will be used by a mining company for a number of years. Then the top extension will be removed and the car put to work in another vein. Capacity is 302 cubic feet level full. All dimensions and capacity can be made to suit your operations.

Delivery of cars, of course, depends on receipt of material and other conditions beyond our control. However, we will do our best to serve you. We can supply needed new wheels, trucks, axles, bumpers and electrically welded end sills with spring bumpers to recondition your old cars.



# YOU LOOK AT IT...

# IT'S A

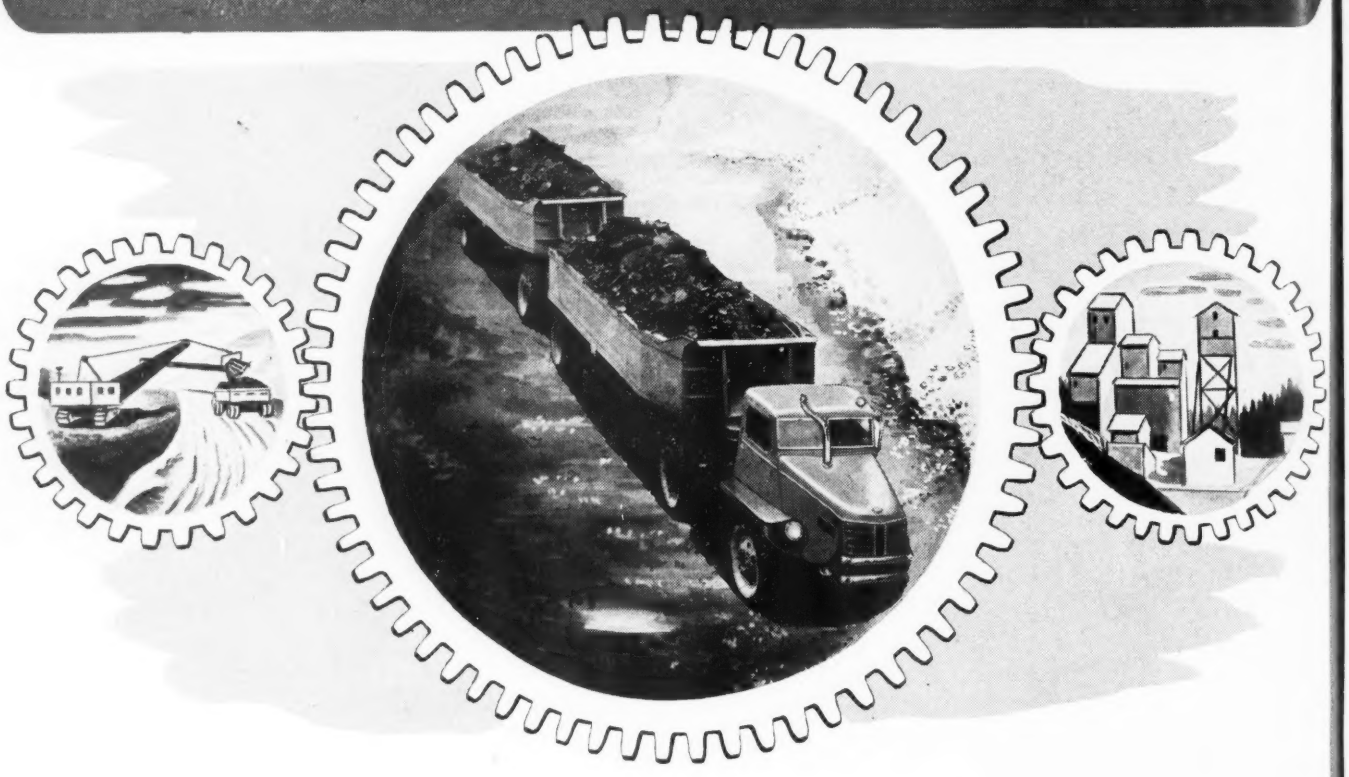


a.C.f. Chilled Tread Mine Car Wheels, as manufactured under our heat-treating process, are made from a special mixture of metals—better for mine car wheels than steel or iron, alone.

a.C.f. AMERICAN CAR AND FOUNDRY COMPANY

New York • Chicago • St. Louis • Cleveland • Philadelphia • Berwick, Pa. • Pittsburgh • Huntington, W. Va.

# HAUL BIGGER LOADS
## TO KEEP 'EM WORKING AT CAPACITY!



Increased distance from shovel to plant need not interrupt your work at either end, as you wait for small-tonnage trucks to complete the longer runs. Keep your pit and plant working as a team, by hauling bigger payloads each trip with Walter Tractor Trucks. 60 tons in two trailer units, 30 tons in single trailers, are hauled at sustained speeds under all pit conditions.

Fewer Walter units are necessary to keep up capacity tonnage, resulting in lower maintenance costs and better use of scarce manpower. Mine roads are not damaged because the Walter Four Point Positive Drive applies tractive power smoothly, easily without wheel slipping—even on soft dirt, loose coal, on steep grades or slippery surfaces. This positive all-Wheel traction permits hauling under year round weather or running conditions.




Behind this performance are other features such as 300 H.P. engine, tractor type transmission, automatic locking differentials, cab forward design, hydraulic steering, powerful air brakes. Write today for the complete story.

**WALTER MOTOR TRUCK COMPANY**
1001-19 IRVING AVE., RIDGEWOOD 27, QUEENS, LONG ISLAND, N. Y.

**WALTER**
**TRACTOR TRUCKS**




# NEW BULLETIN




This new, concise, 2-color bulletin describes and illustrates all types of Hazard Mining Cables. Portable Cables, including Hazacord Reel Cables and Mining Machine Cables of various types — Shovel and Dredge Cables; Miners' Lamp Cord, Shot Firing Cord and many others, are followed by Hazard Mine Power Cables for Shafts and Boreholes in this handy condensed version of the 48-page Mining Cable Catalog No. 179.

Send for the NEW CONCISE HAZARD MINING CABLE BULLETIN, Hazard Insulated Wire Works, division of The Okonite Company, Wilkes-Barre, Pa.

**HAZARD**
**Insulated Wire Works**
**Wilkes-Barre, Pa.**

Gentlemen: Send me your NEW Hazard Mining Cable Bulletin.

Name.....

Company..... Title.....

Address.....

City..... State.....

3870

**HAZARD**

ARMY E NAVY

**INSULATED WIRES AND CABLES**
**for every mining use**



# Why not have your Layout TAILOR-MADE?

This surface installation at a well-known coal mine contains Bethlehem 60-lb. rail, heavy-duty switches, one-piece guard rails, manganese frogs, galvanized rail braces, and complete turnouts. It is a good example of the clean-cut, efficient type of job made possible by Bethlehem's prefabricated trackwork.

Ordering prefabricated mine track from Bethlehem is almost as simple as buying the track for a child's toy train. But there's this important difference: instead of buying curves, turnouts, etc., from a stock catalog, you have Bethlehem's engineers plan your track in advance and tailor it to your individual needs.

After the plan has been accepted and the track calculated, Bethlehem takes care of the cutting, curving, and other details of fabrication in its own shops. All rails, switches, frogs, guard rails, braces, crossings, and other units are then shipped to the customer and assembled at the mine.

When the installation is underground, rugged steel ties are an important part of secondary and room-track layouts. Bethlehem No. 5's, for instance, are designed specifically for 40-lb. rail, and they are built to withstand the terrific weight of today's mechanized equipment. Experience has proved that they can be used over and over again, and that they will easily outlast several sets of wooden ties.

Already a great many mines have recognized the advantages of Bethlehem's prefabricated track. Since preformed track is accurately curved to the proper radii, it saves installation time; saves the worry and work of figuring, cutting, and curving the track on your own property. Mine managers have found, too, that prefabricated track reduces costly derailments . . . that it requires far less attention and maintenance than a "home-made" layout.

A Bethlehem representative with years of experience in mine-track problems will be glad to call at your convenience. He'll study your set-up, and he'll submit facts and figures that definitely prove the economy of Bethlehem prefabricated track.

★ ★ ★ BETHLEHEM STEEL ★ ★ ★

# BEST FOR ROCK WORK



**HEAVY-DUTY FEATURES of the Goodyear HARD ROCK LUG TIRE**




1. Massive lug-bar tread
2. Extra-thick undertread
3. Tread-armored sidewalls
4. Super-strong Rayotwist cord carcass

YES, this husky Goodyear Hard Rock Lug tire gives top performance wherever the haul is heavy over tire-cutting, tire-snagging, tire-bruising ground.

That's true because this great tire, proved by years of experience, is specially designed for rock work — is armor-built throughout. It's armored with heavy beads, with extra-heavy undertread, and with massive, wide-based lugs that grip and guard, extending deep down over the sidewalls to *tread-armor* them against cuts and bruises!

And today this brawny work tire is stronger than ever because it is built with Rayotwist cord — Goodyear's patented rayon cord — the *strongest cord we have ever used in a work tire.*

Goodyear design provides that universal, two-way tread — no rights, no lefts — with the same powerful grip reverse or forward.

It's a *self-cleaning* tread, with straight, wide, V-shaped grooves open at the ends and so pitched that dirt and stones are forced out as the tire turns!

It all adds up to increased job stamina, so it's no wonder that cost-conscious contractors make Goodyear Hard Rock Lugs first choice wherever the going is toughest and roughest.

**THERE'S A GOODYEAR FOR EVERY JOB**



**For drawn dirt-movers specify Goodyear All-Weather Earth-Mover**

**For traction in soft going specify Goodyear Sure-Grip**

BUY WAR BONDS ★ BUY FOR KEEPS

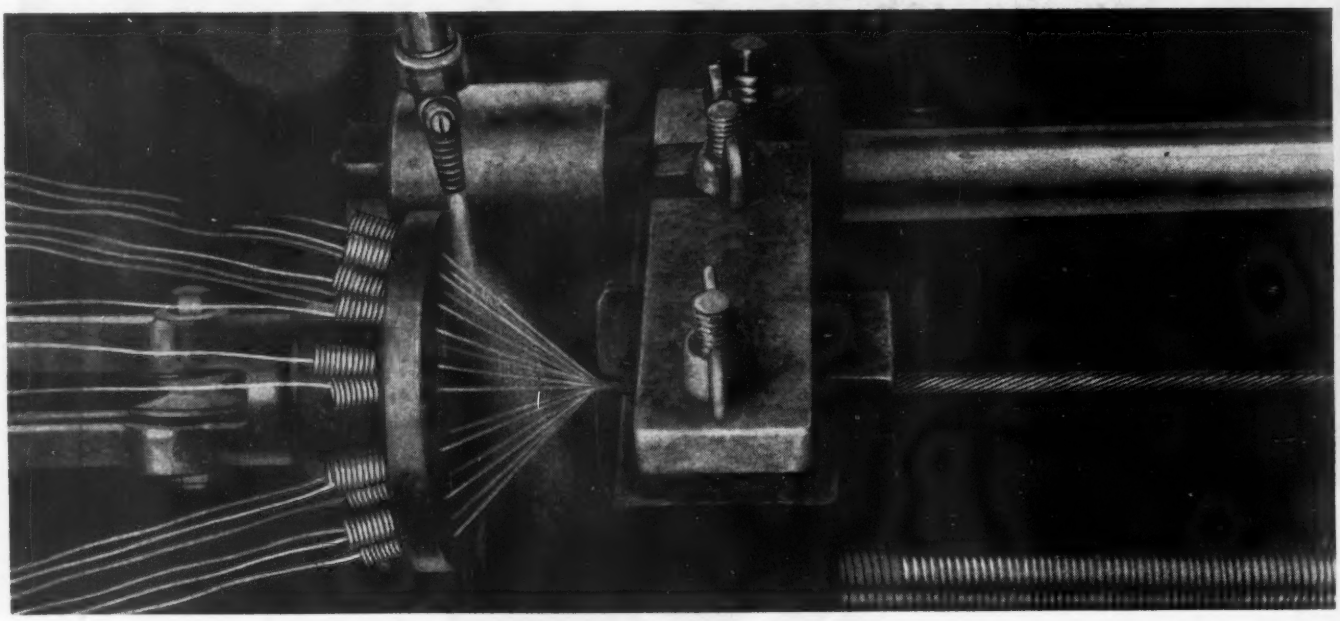
# GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Rayotwist, Sure-Grip, All-Weather—T.M.'s The Goodyear Tire & Rubber Company

# The Lubricant Bath that makes Upson-Walton Wire Rope give Better Service



EVERY wire in any length of Upson-Walton wire rope —and there may be 200 or 300 of them—is a *live* wire in the sense that *all are in motion when the rope is operating.* Every time the rope flexes, every wire in it moves.

Upson-Walton pre-lubrication therefore is of crucial importance to:

1—Prolong the life of the rope

2—Retard corrosion

3—Reduce friction within the rope itself and thereby prevent excessive wear, wire on wire and strand on strand.

Every foot of Upson-Walton wire rope is subjected to a pressure bath of lubricant, actually built into the rope in manufacture. By this method (illustrated above), every wire in every strand is surrounded with lubricant; every void between strands is a reservoir of lubricant and the core itself is *saturated* with lubricant.

The practical effect of pre-lubricating, as performed by Upson-Walton, is this:

1—It permits a better balanced loading of the rope.

2—Weight is distributed more equally between *all* wires; no one wire bears an excessive share of the load.

3—Every wire helps hold the load by easily slipping into the position where it helps the most.

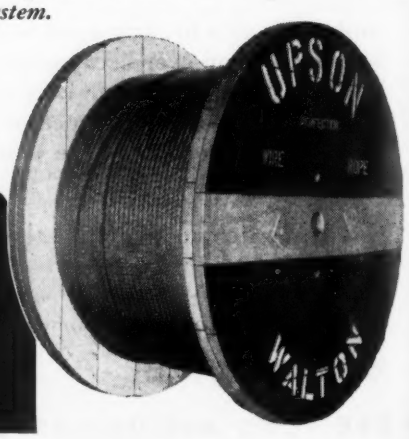
4—The rope can develop its full maximum strength and sustain greater loads than rope which might not be as efficiently pre-lubricated.

It pays to specify Upson-Walton wire rope—*with the built-in lubrication system.*

U-W

Established 1871

***Upson-Walton also manufactures wire rope clips, thimbles and sockets; tackle blocks, snatch blocks, turnbuckles and shackles***




## THE UPSON-WALTON COMPANY

*Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks*

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

# CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

## REDUCES ROOF and RIB FAILURES!



EXPLOSIVE

*Explosives shoot down coal with a shattering blast that introduces shatter-cracks for a distance of 18′ to 20′ in every direction. This weakens the entire coal structure and frequently causes roof and rib failures either at the time of the explosion or later.*



CARDOX

*CARDOX dislodges coal with a slow heaving action that avoids causing shatter-cracks in the roof and ribs as well as in the working face.*

● While not as highly publicized as the more spectacular mine accidents, roof and rib failures cause approximately 50% of the fatalities in underground coal mine operation.

Proof that the shock due to the detonation of explosives is often responsible for dangerous and costly roof and rib falls is disclosed whenever Cardox Engineers run "preparation tests." Long experience has shown that to get a true picture of the effect of CARDOX on coal structure, samples for screen analysis must be taken from 18′ to 20′ beyond the last fall produced by explosives. The first three cuts must be thrown away because the structure of the coal in the intervening area is so weakened by shatter-cracks that it is useless for test purposes.

Obviously the explosive force that weakens coal structure for a distance of 18′ to 20′ must have unfavorable effect on roof and ribs for a considerable distance—must be largely responsible for many roof and rib failures.

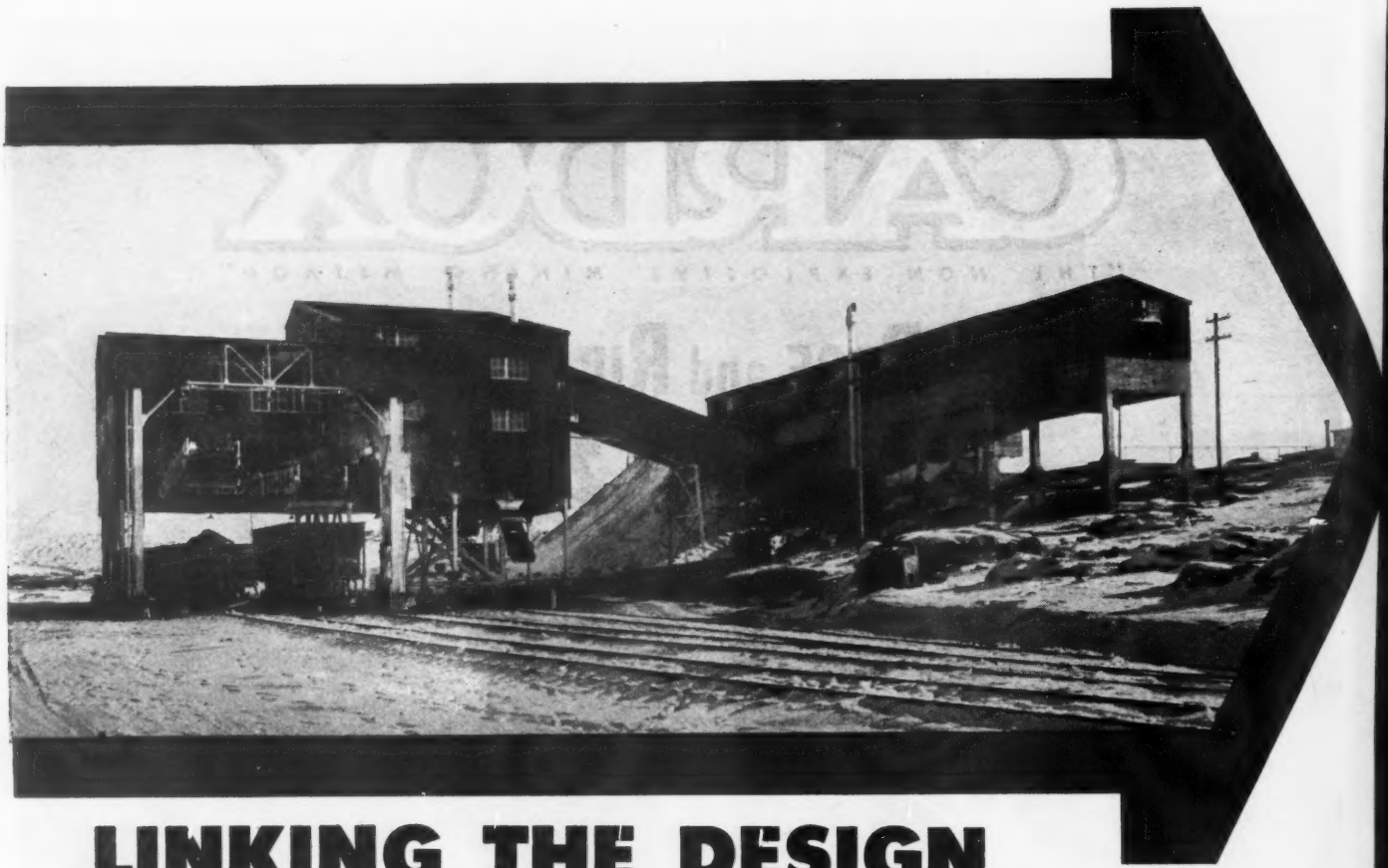
The CARDOX mining method reduces hazards from roof and rib failures because the effect of the CARDOX discharge is mild. It acts with a slow heaving, spreading and shearing action. There is no shattering detonation. There is little disturbance of the roof and rib structure. Accident hazards and timbering costs are reduced.

Let us demonstrate by a test in your own mine the value of CARDOX in reducing a major cause of accidents—*Roof* and *Rib* Failures.

**CARDOX HARDSOCG DRILLING EQUIPMENT**

*Complete line of drilling equipment designed to give you the maximum in drilling efficiency*

**CARDOX CORPORATION** • BELL BUILDING • CHICAGO 1, ILLINOIS



# LINKING THE DESIGN *to the Objective*

THE three principal objectives in the engineering of Union Pacific Coal Company's Stansbury Mine, were SIMPLICITY, COMPACTNESS, and FLEXIBILITY.

This particular operation has demonstrated — since its completion — that a mine doesn't have to be bigger to be better. Its success depends on meeting the particular immediate need, designing to accommodate future greater tonnage and providing the simplest solution which is always the best.

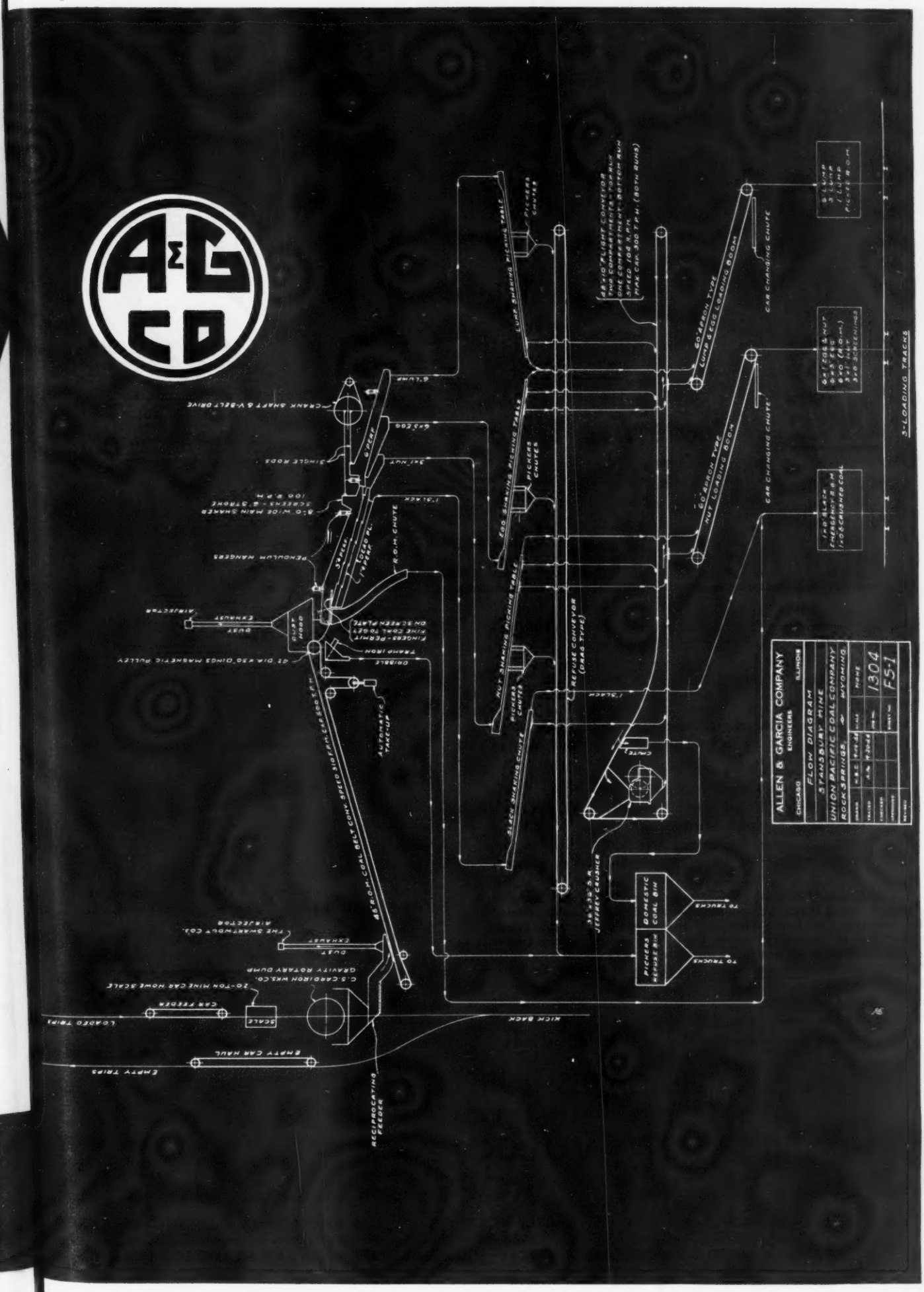
This mine, as does all of A & G projects, operates with minimum equipment, for by virtue of engineering, A & G specialists eliminate a good share of equipment costs.

Whatever your production objective may be, A & G engineers will work to develop facilities patterned for your individual requirements and engineered for greatest overall economy.

## ALLEN & GARCIA COMPANY

*CONSULTING AND CONSTRUCTING ENGINEERS*

332 S. MICHIGAN AVE., CHICAGO 4, ILL. • 120 WALL ST., NEW YORK, N. Y.


A Σ G CO
CRANK SHAFT & V-BELT DRIVE
SINGLE RODS
3½" NUT
8'-0" W.I.DE MAIN SHAKER SCREENS - 6" STROKE 100 R.P.M.
PENDULUM HANGERS
3½" PIPES
LOCO PL. PIPES
R.O.M. CHUTE
DUST HOOD
EXHAUST
AIR JECTOR
FINGERS - PERMIT FINE COAL TO DROP ON SCREEN PLATE
TRAMP IRON
DR. BELT
47' DIA. 430 OINGS MAGNETIC PULLEY
48" R.O.M. COAL BELT CONV. SPEED 310 F.P.M. 250 H.P.
AUTOMATIC TAKE-UP
THE SWARTHOUT CO. AIR JECTOR
DUST
EXHAUST
C.S. CARDIRON WKS. CO. GRAVITY ROTARY DUMP
20-TON MINE CAR HOWE SCALE
CAR FEEDER
SCALE
LOADED TRIPS
EMPTY CAR HAUL
EMPTY TRIPS
RECIPROCATING FEEDER
NICK BACK
6" LUMP
6"x5" EGG
LUMP SHAKING PICKING TABLE
PICKERS CHUTES
EGG SHAKING PICKING TABLE
NUT SHAKING PICKING TABLE
PICKERS CHUTES
BLACK SHAKING CHUTE
REFUSE CONVEYOR (DRAG TYPE)
CHUTE
36"x30" S.R. JEFFREY CRUSHER
PICKERS REFUSE BIN
DOMESTIC COAL BIN
TO TRUCKS
TO TRUCKS
48"x10" FLIGHT CONVEYOR TWO COMPARTMENTS - TOP RUN ONE COMPARTMENT - BOTTOM RUN SPEED 104 R.P.M. MAX CAP. 300 T.P.H. (BOTH RUNS)
60' APRON TYPE LUMP & EGG LOADING BOOM
60' APRON TYPE NUT LOADING BOOM
CAR CHANGING CHUTE
CAR CHANGING CHUTE
6"x5" EGG & NUT
6"x3" EGG
6"x0 (4.0 M.)
3"x1" NUT
3"x0 SCREENINGS
6" LUMP
3" LUMP
1" LUMP
PICKERS R.O.M.
150 SLACK EMERGENCY R.O.M. OR CRUSHED COAL
3-LOADING TRACKS
ALLEN & GARCIA COMPANY
CHICAGO ENGINEERS ILLINOIS
FLOW DIAGRAM
STANSBURY MINE
UNION PACIFIC COAL COMPANY
ROCK SPRINGS WYOMING
1304
FS-1

# Here are 5 TYPES of GATES V-BELTS




## ONE of these five types Will Fit Any Need You Have!

Whenever a drive in your plant is wearing out belts faster than it should—or is giving any other trouble—just *pick up your phone* and call the Gates Rubber Engineer.

He can quickly analyze your problem and, in most cases, he can correct the trouble very easily without needing to specify the use of any special-structure belts.

There *are* service conditions, however, under which a V-Belt of special construction can most profitably be used—and your Gates Rubber Engineer can then supply a Gates V-Belt that is precisely engineered to meet the unusual conditions.

**The Gates V-Belt of special synthetic rubber is a notable example. As a result of specialized research, Gates developed this synthetic rubber V-Belt and began supplying it in large quantities to industry more than six years ago. Under severe conditions of heat and oil, this Gates special synthetic V-Belt actually outwears any natural rubber belt by as much as 230%.**

In your particular application, V-Belts with tension members composed of flexible steel cables —or of rayon cords—may prove to be the most efficient and economical. Again, Gates Static-Safety V-Belts may best fit yur special need.

In any case, the wisest move you can make is to phone the Gates Rubber Engineer. (Just look under "Gates Rubber" in your phone book.) He will come right to your plant—will thoroughly analyze any drive problem you may have—and he will always recommend the practice that will be most efficient and economical for you.

4412

THE GATES RUBBER COMPANY

*Engineering Offices and Stocks in All Large Industrial Centers*

**GATES VULCO ROPE DRIVES**

**CHICAGO** 6, **ILL.** 549 West Washington
**NEW YORK CITY** 3, 215-219 Fourth Avenue
**ATLANTA** 3, **GA.** 738 C & S National Bank Building
**LOS ANGELES** 21, **CAL.** 2240 East Washington Boulevard
**DENVER** 17, **COLO.** 999 South Broadway
**DETROIT** 4, **MICH.** 8663 Grand River Avenue
**PORTLAND** 9, **ORE.** 333 N W 5th Avenue
**DALLAS** 2, **TEXAS** 1710 N Market Street
**SAN FRANCISCO** 3, **CAL.** 1090 Bryant Street







# Both AC and DC WELDING with the *Same* ELECTRODE!

Here they are . . . two new P&H electrodes — which perform equally well on either AC or DC!

Thoroughly proved in a wide variety of work, these remarkable new electrodes deliver an arc that is extremely stable, easily controlled and produces fine, uniformly strong welds.

You've waited for this . . . to simplify your welding problems — to make your electrode buying easier . . . to save time and money. Convince yourself—on your own welding jobs — that they are a practical answer to better welding at lower costs.

Place a trial order *today!*

**AC-1 (E-6010 and E-6011)**

For AC, and either polarity on DC. • Tensile strength, 65,000-70,000 P.S.I. • Yield, 55,000-60,000 P.S.I. • Ductility, (2"), 25% to 35%. • Available in all sizes — 14" and 18" lengths.

Conforms to requirements of: U. S. Navy Bureau of Ships specifications 46-E-3 Grade 3, Class 1, 2 and 3. • Hartford Steam Boiler and Insurance Company. • American Bureau of Shipping. • Lloyds Register of Shipping.

**AC-3 (E-6012 and E-6013)**

For AC, and either polarity on DC. • Tensile strength, 65,000-70,000 P.S.I. • Yield, 55,000-60,000 P.S.I. • Ductility, (2") — 18% to 25%. • Available in all sizes — 14" and 18" lengths.

*Conforms to requirements of:* Hartford Steam Boiler and Insurance Company. • American Bureau of Shipping. • Lloyds Register of Shipping. • *Full information and procedures on request.*

**A COMPLETE ARC WELDING SERVICE**

DC WELDERS | AC WELDERS | WELDING POSITIONERS | PRODUCTION CONTROL SYSTEMS

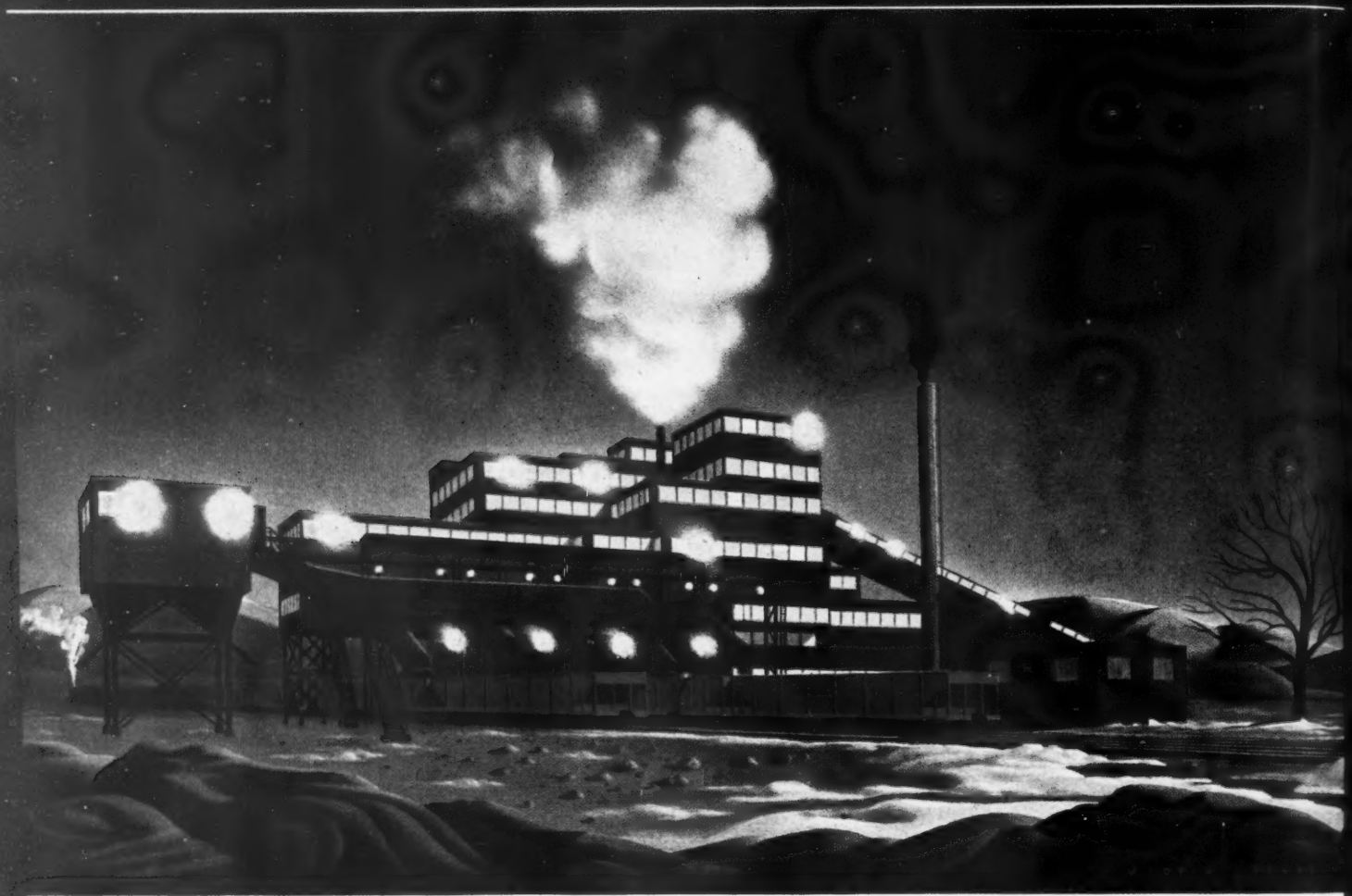


*General Offices:*
4540 West National Ave., Milwaukee 14, Wisconsin

**HARNISCHFEGER CORPORATION**
WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

*Canadian Distribution:* The Canadian Fairbanks-Morse Co., Ltd.

# NIGHT LIFE *that pays dividends*



*Courtesy Pyramid Coal Corp., Victory Mine, Terre Haute, Ind.*

***The night scene at Victory mine*** stands as another glowing example of the development of an abundant fuel supply from coal which was originally of such high ash content that it could not possibly be sold at a profit . . . either in the raw state or hand picked. Tests made in the McNally laboratory proved to Victory executives that the ash content in their coal could be greatly reduced by washing, and that, when mechanically and thermally dried, it would meet specifications for locomotive firing, and classify as premium fuel as well.

***Locomotives on the main lines of the Pennsylvania Railroad*** formerly used other coals which had to be transported longer distances to coaling stations at additional cost. But, since Victory's preparation plant has been in operation, much of the output has been used for firing Pennsylvania main line locomotives.

***Shifts work night and day.*** Even this double production is not sufficient to meet the ever-growing demand in a territory where . . . in the beginning . . . the raw coal was not fit to be sold at a profit. The night shift at Victory, necessitated by the development of the property from a dormant state to active operation, is indeed "night life that pays dividends."

***Postwar reconversion*** is simple. It will take but a few minutes of time to convert the preparation plant to produce stoker coal for steam and domestic uses.

***When executives of coal mining companies decide to capitalize*** the new possibilities of coal preparation, it takes courage and business acumen. But their sales and production departments have felt the competition of other mines using such equipment, and this gives impetus to investigation. Conferences of your operating and executive departments with our technical staff bring the production and profit advantages of mechanical coal preparation out in the open. We welcome such conferences . . . wherever bituminous coal is mined . . . anywhere in the world.

**McNALLY PITTSBURG**

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

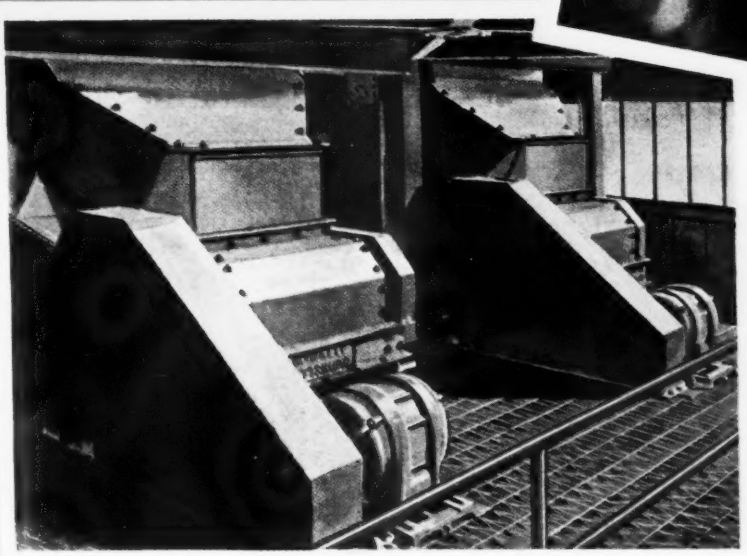
McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans. • Chicago 1, Illinois • Pittsburgh 19, Pa. • Caixa Postal 1310, Rio de Janeiro, Brazil

# RECONVERSION? *Only a matter of minutes* IN A PLANT LIKE THIS



• At the touch of a switch, loading booms again go into position to load premium grades of industrial and domestic coals. The loading boom in the foreground is in position to discharge its product into the domestic bin for truck loading.





• When premium markets again call for greater ash reduction, this can be met by complete removal of stratified coal from the primary washer. Then, stratified coals are crushed and re-treated in the McNally Pittsburg Automatic Compound (illustrated above).

• The rapidly growing demand for stoker sizes has resulted in the development of Stoker Coal Crushers (left) for crushing egg and nut sizes to 1¼", 1", or ¾". Breaking teeth produce a "splitting" action which reduces fines to an absolute minimum.

← *(To the left is a reproduction of advertisement Number 5 in our series in Fortune Magazine)*

**McNALLY PITTSBURG**

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans. • Chicago 1, Illinois • Pittsburgh 19, Pa. • Caixa Postal 1310, Rio de Janeiro, Brazil




# Rock or Dirt









## DUMPED INSTANTANEOUSLY

**Time saved on the fill is time saved for every trip . . . more trips per hour . . . more production per shift. The Koehring Dumptor dumps any type material *instantaneously*. Seconds saved over mechanical dumping method speeds up every hauling and dumping job. Rock or dirt is dumped equally fast and the load is dumped clean every time . . . ready for a full load every trip.**

**KOEHRING COMPANY**
*Milwaukee 10, Wisconsin*

**DEPEND ON YOUR KOEHRING DISTRIBUTOR** to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

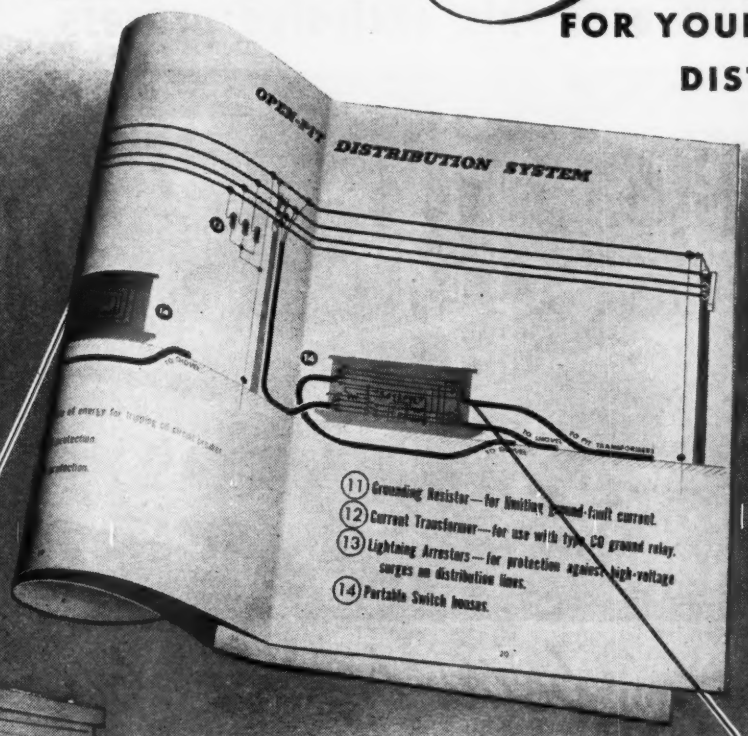
ARMY E NAVY

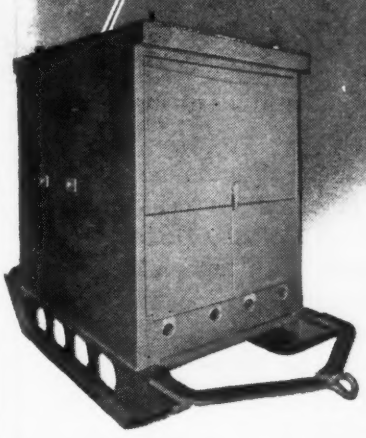
KOEHRING HEAVY DUTY

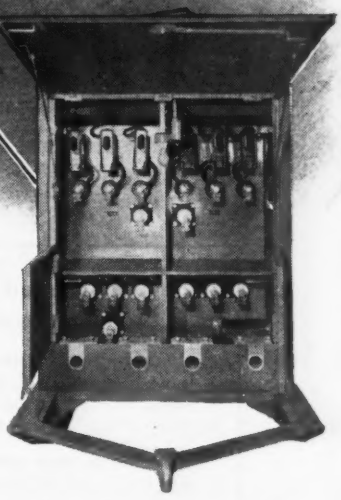
**HEAVY-DUTY CONSTRUCTION EQUIPMENT**

# Portable Power

## FOR YOUR OPEN-PIT DISTRIBUTION SYSTEM





Power for your shovels—where you want it—close to the work, quickly movable, reliable and *safe.* That's exactly what you get in the new Westinghouse portable switch house.

This skid-mounted power center is a weatherproof, tamperproof unit that contains all the switchgear and protective equipment for the individual shovel feeders. It is equipped with terminals for one incoming cable and up to three outgoing feeder cables. It provides a safe, easy means of distributing power to shovels, and to portable transformers supplying the power for drills, pumps or other equipment.

Avail yourself of the economy and safety these portable switch houses can give. For complete information write, wire or phone your nearest Westinghouse representative. Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Penna. J-94635

**The Portable Switch House Provides:**

1. Manually operated disconnect switch
2. Manually operated oil circuit breaker
3. Relay to open breaker instantly in case of fault on system
4. Fused disconnecting means for feeder lines
5. Clamp type connectors for all power cables
6. Skids for quick, easy moving—attachments for chains or ropes

Upper door of switch house affords protection for workmen when making connections or working with fuse cutouts. Lower doors normally are closed. Door switches control interior illumination.

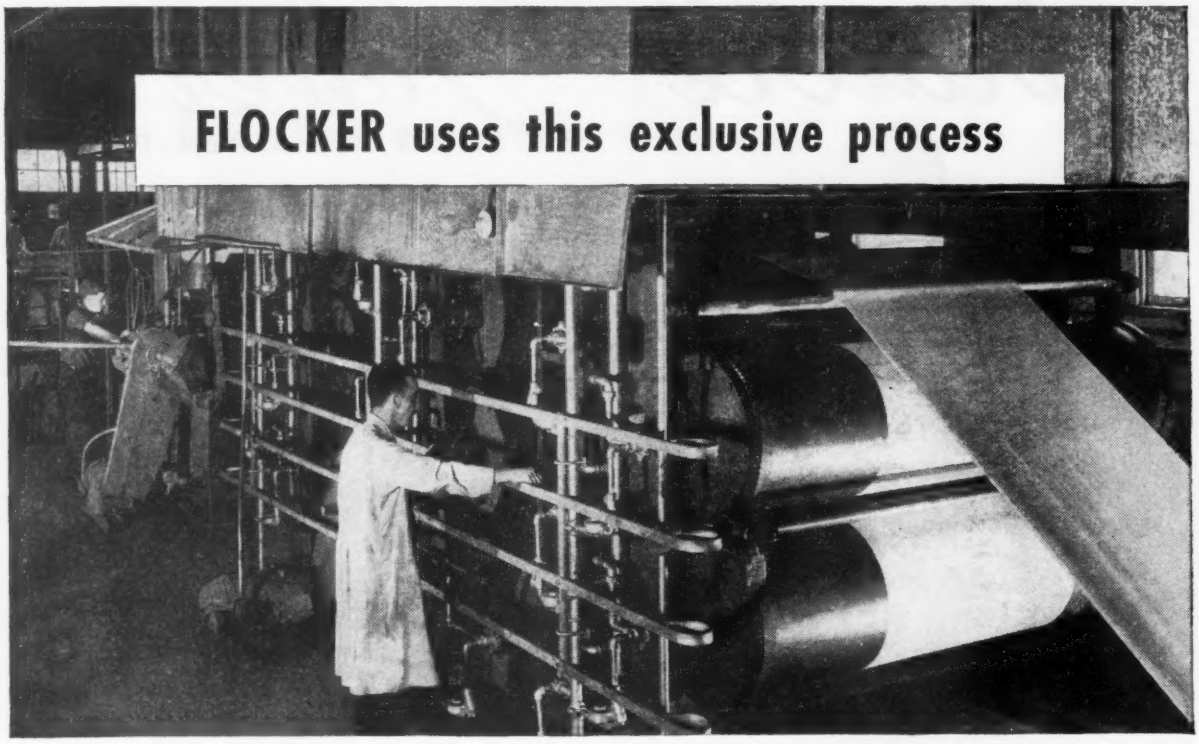


**WESTINGHOUSE PRESENTS**
. . . JOHN CHARLES THOMAS
SUN. 2:30 EWT., NBC.
"TOP OF THE EVENING"
MON. WED. FRI. 10:15 EWT., BLUE NET.

**Westinghouse**
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Westinghouse manufactures every type of equipment needed for a complete modern open-pit distribution system. How this equipment can provide adequate protection is shown in a new illustrated 36-page book, B-3282. Write for your copy.

*Electrical Equipment for the Mining Industry*



# FLOCKER uses this exclusive process

## . . . to give you *better brattice cloth*

Flocker Moropa Brattice Cloth offers greater resistance to fire and mildew . . . stays clean longer and, under identical conditions, outwears the ordinary product.

This all-around superiority is achieved through an exclusive chemical process applied to either Jute or Cotton. The fabric is first saturated with special chemicals, then "can-dried"—a process adapted from the textile field—which thoroughly impregnates and bakes fire and mildew resisting properties into every fiber of the material.

And yet, in spite of its superior qualities, Flocker Moropa Jute Brattice Cloth costs you no more than ordinary Brattice Cloth . . . and prices are only slightly higher on Cotton. In reality, substantial savings can be realized on the use of either type.

If you're interested in the advantages this better Brattice Cloth affords, write for detailed information and quotations.

**PROVED SUPERIORITY IN COTTON OR JUTE!**

**SUPERIOR FIRE-RESISTANCE**—Protection lasts almost indefinitely, since chemicals are so thoroughly impregnated that they do not readily leach out.

**SUPERIOR MILDEW REPELLENCE**—Chemicals used do not absorb excessive moisture and fabric remains relatively dry and repellent to mildew.

**STAYS CLEAN**—Does not collect mildew "whiskers"—hence no slimy dirt.

**LONGER SERVICE**—Can be used and re-used over and over again. Absence of slime eliminates objections to recovery—men will co-operate in maintaining this Brattice Cloth which so vastly improves their working conditions.

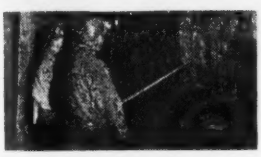
**JOHN FLOCKER AND COMPANY**

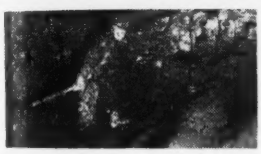
644 GRANT STREET, PITTSBURGH 30, PA.

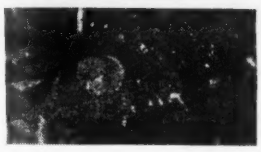
*Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen . . . Specialists in Cordage Problems . . . Wire Rope*

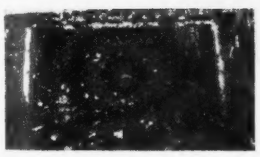
















AMERICAN
CYANAMID & CHEMICAL CORPORATION
EXPLOSIVES

# *Watch your loader operation*

Your loader will handle more tonnage when your coal is properly broken and rolled out from the face . . . which, in the final analysis, depends on the type of explosive you have selected to bring it down. Therefore, for better results,

## Watch the characteristics of the explosive you use . . .

Products of intensive research, chemical control, thorough inspection and unremitting care in manufacture, the list of available AMERICAN permissibles, both non-gelatinous and gelatinous, will provide the blasting agent best fitted to your problem.

- **HIGH EXPLOSIVES**
- **PERMISSIBLES**
- **BLASTING POWDER**
- **BLASTING ACCESSORIES**

• *Capable field engineers are available at your call.*

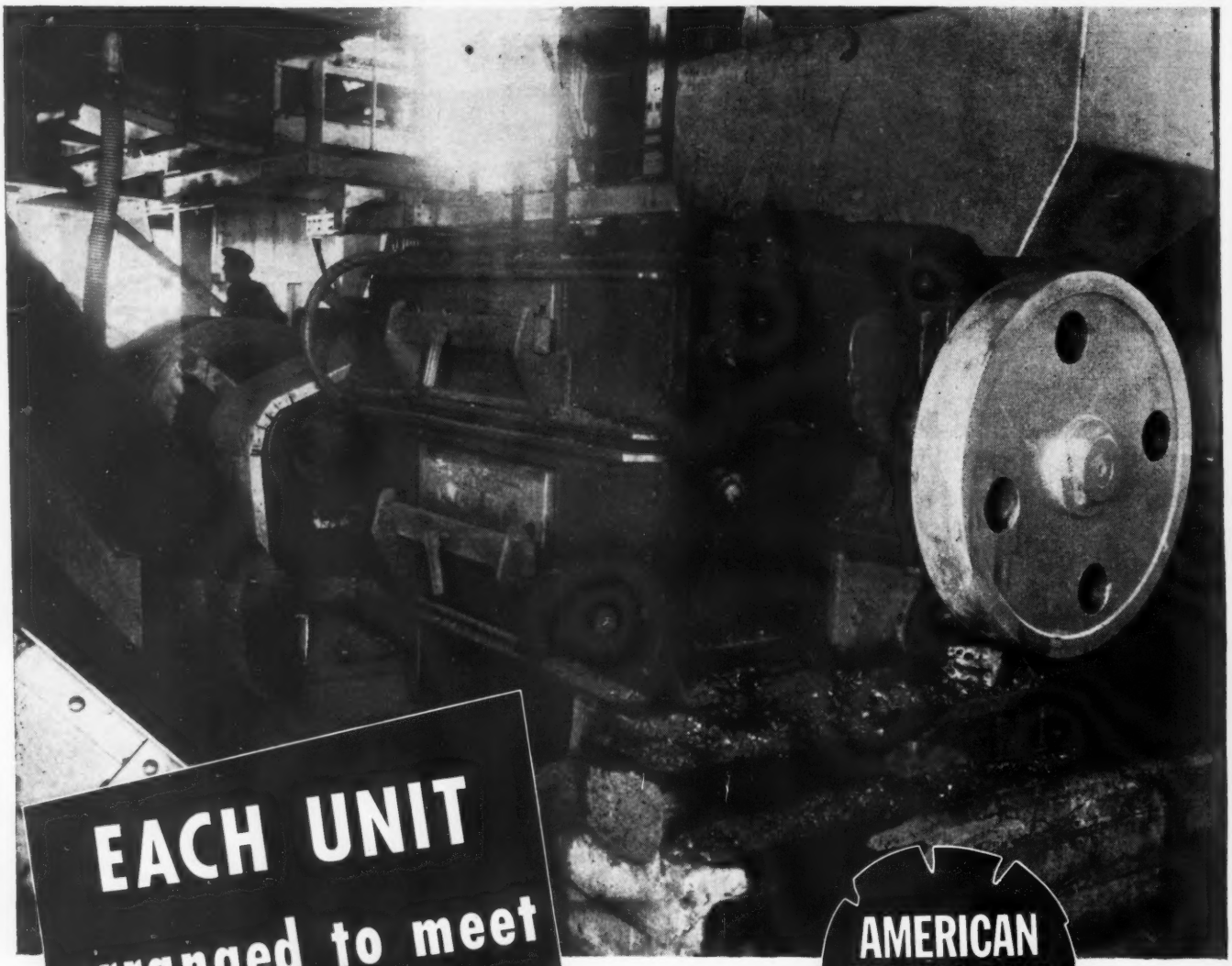
# American Cyanamid & Chemical Corporation

*A Unit of American Cyanamid Company*

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

EXPLOSIVES DEPARTMENT

**SALES OFFICES: PITTSBURGH, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill. Pottsville, Pa. Hazleton, Pa. Maynard, Mass.**



# EACH UNIT arranged to meet the particular requirements of EACH INSTALLATION

**AMERICAN ROLLING RING CRUSHERS**

- COMPACT
- EXTERNALLY ADJUSTED
- EASILY ACCESSIBLE
- CRUSHING AT LESS THAN A CENT A TON
- UNIFORMITY OF SIZE
- GREATER RANGE OF REDUCTION



These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal, the rings are momentarily deflected from their usual course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.

You can get an American Rolling Ring Crusher in the correct type and size for your requirements. Regardless of the type we find practical for your purposes, you are assured of large daily tonnages of coal properly sized at extremely low cost. Let us survey your requirements and make recommendations.

The Patented Manganese Shredder Rings split the coal and prevent clogging

**AMERICAN PULVERIZER COMPANY**
1119 MACKLIND AVENUE
ST. LOUIS, 10, MISSOURI
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

# What is most important to you in mine loader lubrication?



IS IT { reducing wear and parts replacements?
eliminating coking and deposits?
stopping leakage and lubricant separation?
reducing overheating and lost machine time? }

OF COURSE, you don't want one of these troubles any more than another. But they do happen. It may be leakage on one machine, deposits on another, and so forth.

It may be because your loaders are older, or they're worked harder. They need the best care you can give them. That may not be the *same* care they had five years ago—or even a year ago. You can keep loaders out of a lot of trouble by finding the right mine loader lubricant for *today's* operating conditions.

Common problems of mine loader lubrication and their causes—except for mechanical trouble—are listed at the right. Superla Mine Loader Lubricants—in eight grades—are designed to help eliminate these problems. A Standard Oil Lubrication Engineer can help you test and apply Superla to your present equipment.

Ask the Standard Oil Industrial Service Representative who calls on you to "make a date" for you with the Standard Oil Mine Lubrication Specialist in your locality, or write Standard Oil Company (Indiana) office, 910 South Michigan Avenue, Chicago 80, Illinois.

**Superla *Mine Loader* Lubricants**

**Possible cause of mine loader lubricating trouble.**

**EXCESSIVE WEAR.**
Possible cause:
1. Lubricant viscosity too low.
2. Lubricant thins out under heat.
3. Poor load-carrying qualities of lubricant.
4. Dirt in lubricant through improper handling.

**COKING AND DEPOSITS.**
Possible cause:
1. Overheating of gears.
2. Separation of lubricant and the leakage of oil, leaving heavy part of lubricant to solidify.
3. Too infrequent cleaning of gear-cases.
4. Poor oxidation stability of lubricant.

**OVERHEATING.**
Possible cause:
1. Lubricant viscosity too high.
2. Too much lubricant in cases.
3. Lubricant separation.
4. Excessive leakage and rapid loss of lubricant.

**LEAKAGE.**
Possible cause:
1. Lubricant viscosity too low.
2. Separation of oil.
3. Excessive thinning of lubricant under heat.
4. Too much lubricant in cases.

*Gasoline Powers the Attack*
*. . . Don't Waste a Drop!*

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

**STANDARD OIL COMPANY (INDIANA)** STANDARD SERVICE

# Performance Report on an INTERNATIONAL KR-11

THE INTERNATIONAL KR-11 below is one more example of the value of *ample truck capacity* and *power*. This all-truck truck, powered by the famous Red Diamond Engine, hauls 15 to 16 tons of coal a 32 mile run.

Arthur Atherton, Washington, Indiana, is the owner. His performance report says:

**Owner: Arthur Atherton, Washington, Ind.**

International Model KR-11; 149-Inch Wheelbase
Engine: International Red Diamond 450
Axle Ratio. 8:05 to 1
Transmission: 5-Speed, Direct in Fifth
Semi-Trailer· 24 Foot
Payload. 15 to 16 Tons
Distance: 32 Miles Loaded, and 32 Miles Return
Fuel Consumption· 5 to 6 Miles per Gallon

Pledged U.S. TRUCK CONSERVATION CORPS

"I formerly used two 1½ ton units to haul the same amount of coal. This is the largest truck I ever owned. **Its reserve power is amazing.** It is seldom necessary to shift gears.

"Gasoline mileage is surprising, averaging 5 to 6 miles to the gallon. The old 1½ ton tractors averaged only 6 to 7 miles to the gallon so you can see there is a great saving of fuel. There is also a saving in manpower as only one driver is required.

"This is the easiest riding and operating truck I've ever owned. **I am firmly convinced of the economy of using a truck large and powerful enough for the job."**

**INTERNATIONAL HARVESTER COMPANY**
180 North Michigan Avenue, Chicago 1, Illinois

HARVESTER

INTERNATIONAL



**New Trucks:** The government has authorized the manufacture of a limited quantity of trucks for essential civilian hauling. International is building them in medium-duty and heavy-duty sizes. See your International Dealer or Branch for valuable help in making out application.

# INTERNATIONAL *Trucks*

# HONOR GRADUATES OF THE SCHOOL OF

# *hard knocks!*





## AMERCLAD

## will give you long, dependable service under tough working conditions

IN this kind of service — where portable power cables are subjected to every kind of abuse— dragged over rough and rocky ground, hauled through water, grease and mud, stepped on, run over and heartlessly exposed to every change of weather, AMERCLAD really shows how much stamina and endurance can be built into a cable.

Designed and constructed to deliver an uninterrupted flow of power, AMERCLAD Portable Power Cables meet every requirement of the wartime speed up.

AMERCLAD Low Voltage Cables are flexible to permit continual reeling and unreeling, yet are sufficiently tough and rugged to withstand severe usage of all kinds. They are designed to operate satisfactorily under heavy overloads and attendant high temperatures. Their resistance to water, oil and acids is a further aid to long service.

AMERCLAD High Voltage Cables provide high impulse strength plus flexibility without danger of corona cutting so that when operated with suitable line protection they insure continuity of service and freedom from breakdown.

Even now, when crude rubber is not available and the use of Neoprene is greatly restricted, we have developed synthetic rubber compounds for use in Amerclad Cables that carry on the old tradition of trouble-free service. To save time and money, use AMERCLAD.

*We manufacture for mine use:*

- **Electrical Wires and Cables of all kinds**
- **Tigerweld Power Bonds**
- **Aerial Tramways**
- **American Tiger Brand Wire Rope (Excellay Preformed or Standard Non-Preformed)**
- **Wire Rope Clips, Slings and Fittings**

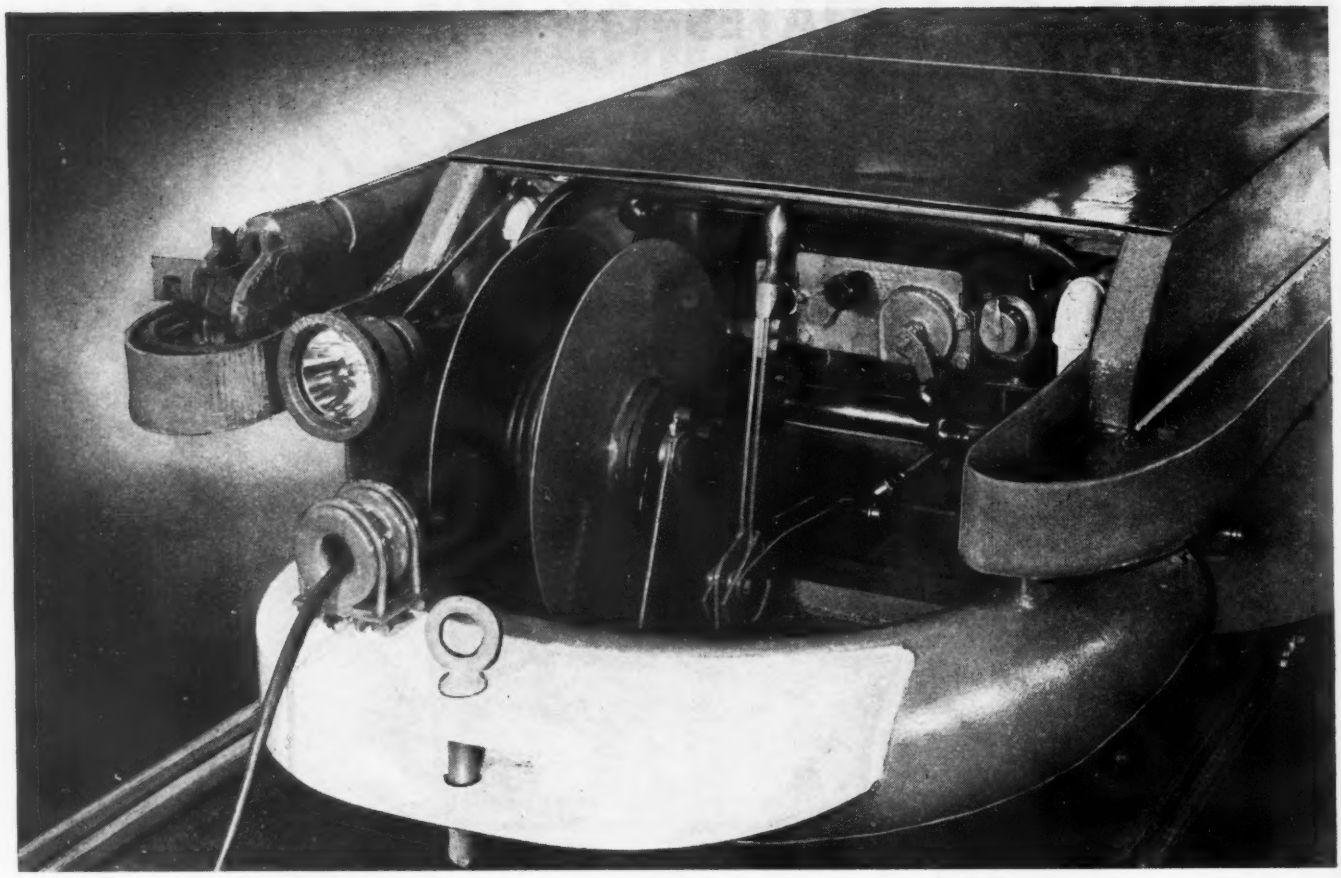
## AMERICAN STEEL & WIRE COMPANY

*Cleveland, Chicago and New York*

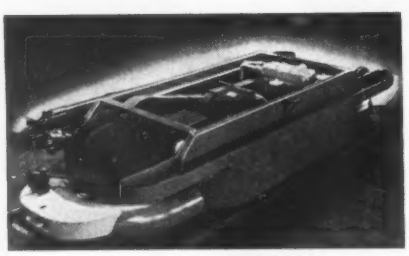
*For Anthracite Service:* Miners Bank Building, Wilkes-Barre, Pa.
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

USS

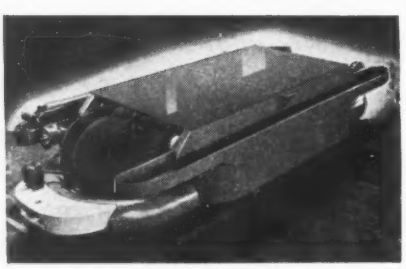
UNITED STATES STEEL



Control end of Cantrell Type SP Compressor is shown above.



Cantrell SP Compressor with safety top removed



— with top in place

*Give your drill crew a Cantrell SP and you give them the finest; the fastest; the most economical compressor known!*

# It Takes You There . . . Gets Its Job Done . . . Brings You Back—

## *—all under its own power*

● TODAY, NO MINE IS FULLY EQUIPPED WITH ESSENTIAL OPERATING MACHINES WITHOUT A CANTRELL SELF-PROPELLED AIR COMPRESSOR! HERE ARE A FEW OF THE REASONS WHY.

• • •

Air compressor service is an absolute necessity for numerous jobs in any mine. Yet, many mines are falling short of complete compressor service simply because the time and expense required to get present compressor equipment to and from the job is too great to justify its use.

The Cantrell, Type SP, compressor is revolutionizing compressor service in coal mining. No longer need you tie up a costly locomotive with crew for moving an air compressor from job to job, along with an extra car for hauling tools and repairs.

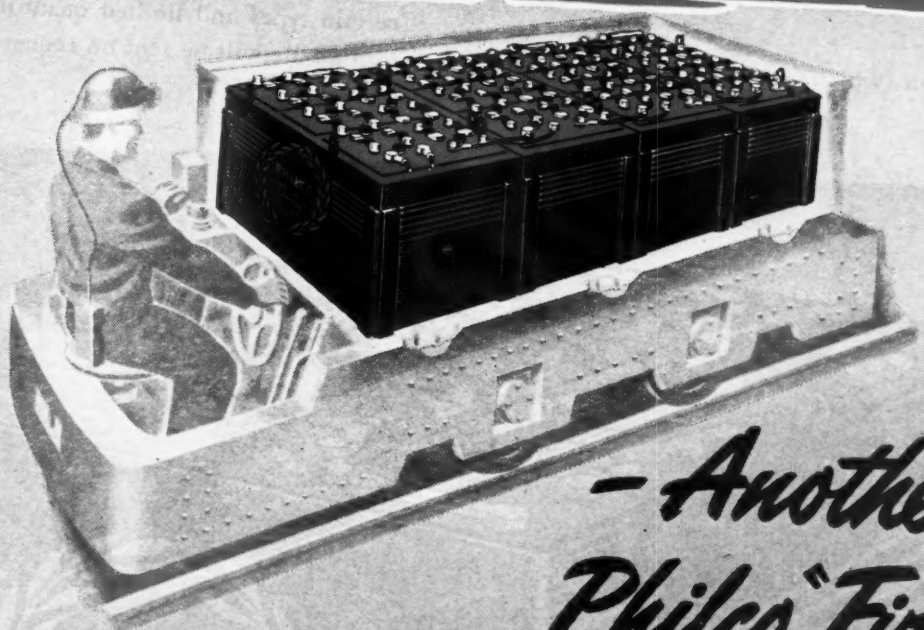
The Cantrell, Type SP, is more than a heavy duty air compressor. It is a self-contained locomotive, capable of rapid tramming to any point. Upon arrival at job, power is instantly changed from tramming to compressor . . . as simply as changing gears in an automobile. In addition, space for hauling tools and repair equipment is provided in the Cantrell SP. Mines using the Cantrell SP will tell you it is indispensable to efficient mining. In addition to regular drilling work, you use the Cantrell SP for ditch lining, leveling haulways, hauling repairs, shifting pumps and mining machines, chipping, riveting, blowing substations, and, it takes you there, gets the job done, brings you back . . . all under its own power . . . a new, broader service in a complete air compressor. Write for complete details now, to Imperial Bronze Manufacturing Co., Jellico, Tennessee.

**Cantrell COMPRESSORS**

# PHILCO

*Again in the News*

# THE BATTERY THAT GIVES 30% LONGER LIFE



*—Another Philco "First"*

*Revolutionary new*

# PHILCO "THIRTY"

## WITH 30% LONGER LIFE RADICALLY CUTS MINE BATTERY COST!

★ *Reduces depreciation and maintenance*
★ *Gets more work done*
★ *Packs a terrific wallop*

What every mine operator wants in a locomotive and shuttle car storage battery is **packed** into this amazing new Philco "Thirty."

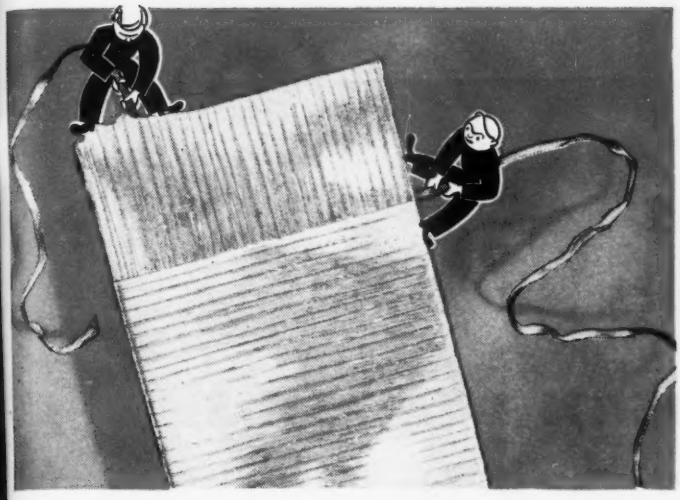
In high capacity, it is **tops** in the field—assuring the maximum tonnage every shift. Even after long hours of heavy work, it has the reserve power to climb ramps and grades, and complete the shift in *high*.

But the feature which sets the new Philco "Thirty" entirely apart from all other batteries you have known, used, or even heard of before—is its phenomenal long life. **30% longer life**—often more—has been demonstrated time after time in exhaustive field tests.

Here, then, is more than just a new and better battery. Here is a new standard of battery performance—*and* a new yardstick by which all battery values must now be judged.

That's why it will pay you to get posted on this great new Philco Battery which is now available in certain types and limited quantities. Full information gladly will be sent on request.



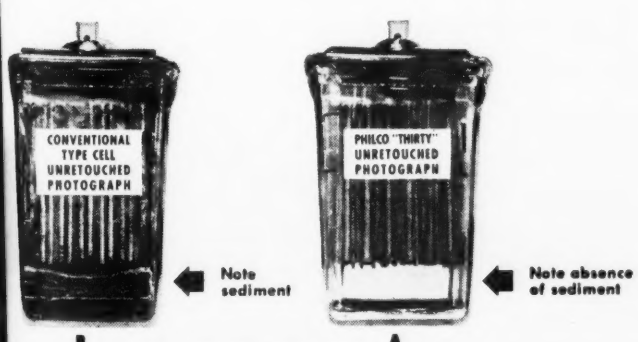


## REVOLUTIONARY NEW PRINCIPLE OF PHILCO FABRICATED INSULATION*

*Only PHILCO "THIRTY" has it!*

Here is a brand-new construction principle *and* an ultra-modern application of a proven insulating material. Both the results of Philco pioneering! This material is fabricated glass tape wrapped around the positive plates in two layers, first vertically and then horizontally. Even a single layer of this glass tape insulation has been found to have better retentive power in holding the active material in the plate, than the standard glass mat! And—of course, the plates of the Philco "Thirty" are further protected and insulated with the time tested Philco slotted rubber retainer and rubber separator. **Patent applied for*

**YOU GET IT FIRST WITH PHILCO**




## PROVED BY YEARS OF FIELD AND LABORATORY TESTS

As proved in scores of service tests, these unretouched photographs show what happens when a Philco "Thirty" cell (A) and a conventional type cell (B) are tested side by side in motive power cycle service, charged and discharged in series in the same circuit. Glass jars were used here only to permit observation. Note almost total absence of sediment in the Philco "Thirty", while the sediment space of cell B is filled. Cell B has delivered its normal life expectancy and is worn out—while the Philco "Thirty" still delivers over 100% of rated capacity, with a long margin of serviceable life still to go.

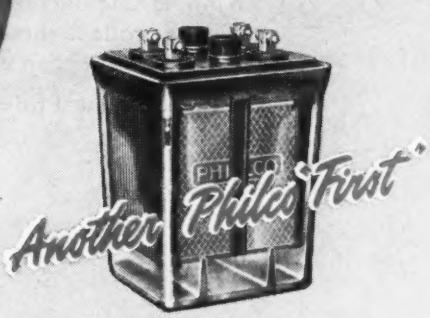
## THE CLIMAX OF 50 YEARS OF LEADERSHIP IN BATTERY RESEARCH AND ENGINEERING

The procession of Philco "Firsts", covering the whole field of motive power and stationary batteries, has set the pace in modern battery design. Check the developments, which have contributed most to today's higher capacities, increased efficiency, longer life, and lower cost—the record shows *you get it first with Philco.*




### PHILCO VITRABLOC

A development for telephone, control and standby service, that materially increases battery room capacities.




### PHILCO FLOTÉ

The battery that exerted a major influence on the wider use of full float service, by eliminating low cells. More efficient . . . more economical to maintain.




### PHILCO HIGH CAPACITY CELLS

Through modern plate design, Philco showed the way to increased capacity without increase in over-all battery dimensions. A tremendous advantage in many motive power operations.

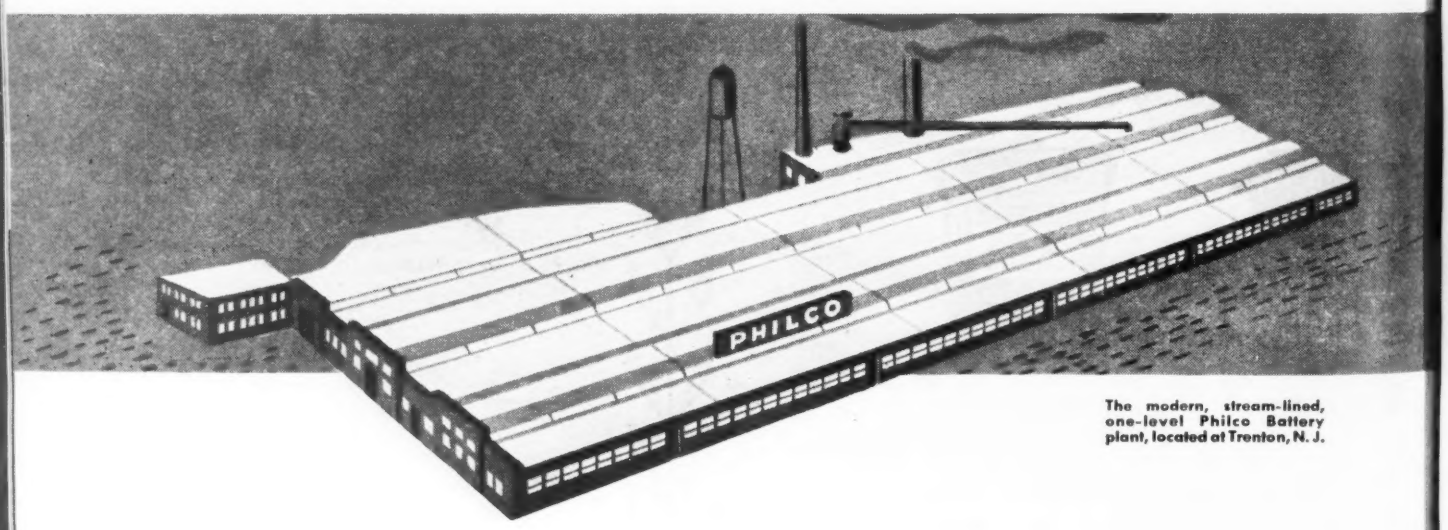
# PHILCO

## BUILT FOR MODERN DEMANDS BY THE LEADER IN MODERN BATTERY ENGINEERING

As described in the foregoing pages, Philco is ready, today, with the advanced battery performance and long-life economy you'll need in your post-war operations. With model manufacturing facilities, Philco is ready to produce these superior batteries in greater volume than ever before.

In the complete Philco line are modern storage batteries for all industrial applications—industrial trucks, mine locomotives and shuttle cars, diesel starting, railroad car lighting and air conditioning, control and power, telephone service and signal systems.

On your next purchase of storage batteries specify a modern Philco.

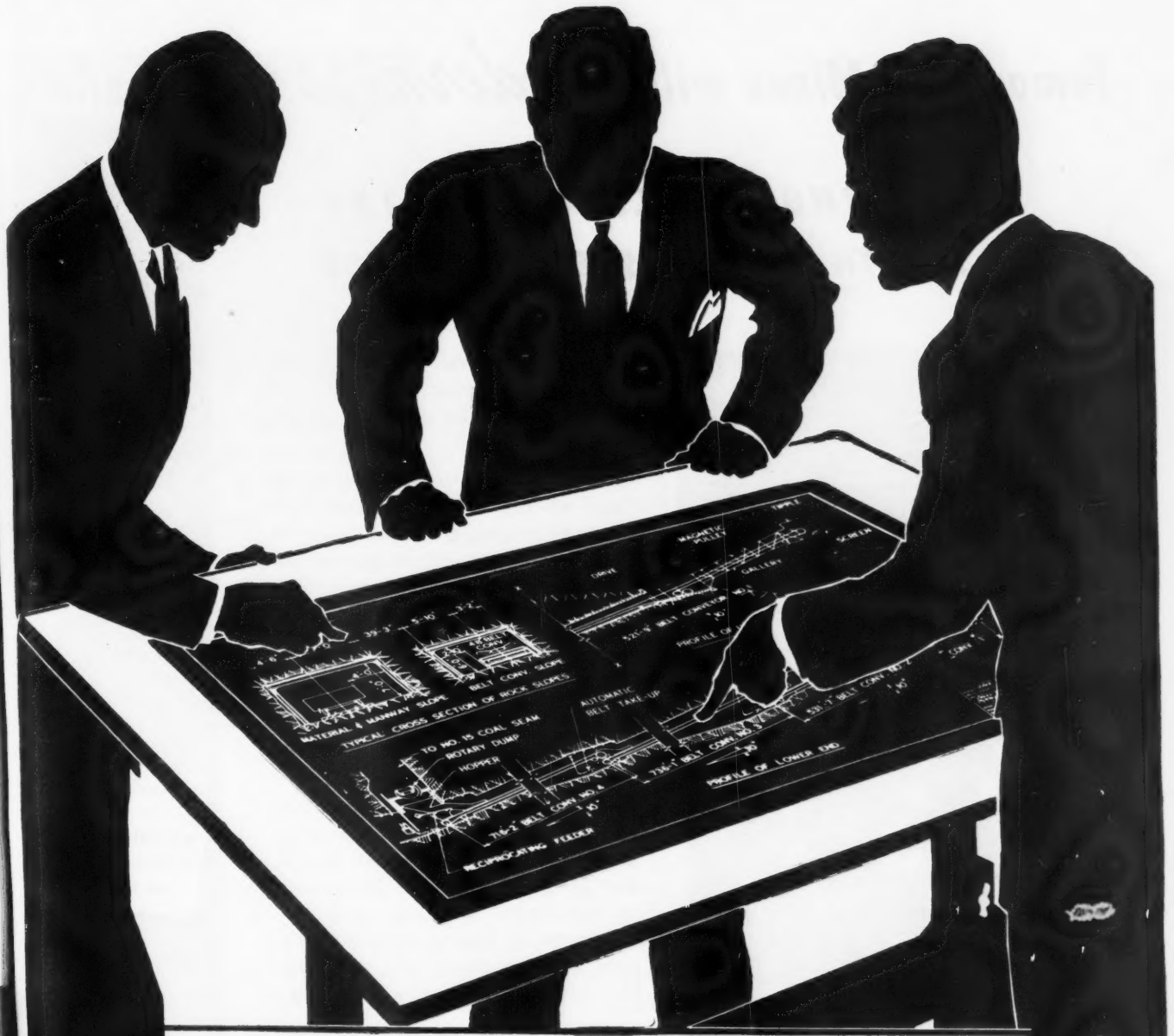



The modern, stream-lined, one-level Philco Battery plant, located at Trenton, N. J.

**PHILCO CORPORATION**

**STORAGE BATTERY DIVISION • TRENTON 7, NEW JERSEY**

*For 50 Years a Leader in Industrial Storage Battery Development*




# 3 ENGINEERING TECHNIQUES

## ARE ESSENTIAL

The skills of three separate engineering staffs determine the design of your U. S. Rubber Conveyor Belts.

For every conveyor belt must be individually engineered, if it is to prove satisfactory in all respects. The particular conditions under which it will operate must be known and considered.

The design and construction of a U. S. Rubber Conveyor Belt, therefore, is influenced from the time a mine or quarry is planned.

Long before we produce a belt for you, our engineers have held two vitally necessary consultations: one with your engineers *at the scene of service;* another with the makers of the mechanical conveyor equipment installed.

Only through such coordinated effort can a conveyor belt be properly designed and built. All three groups must make their technical contribution in developing belts that can be relied on for long, economical service.

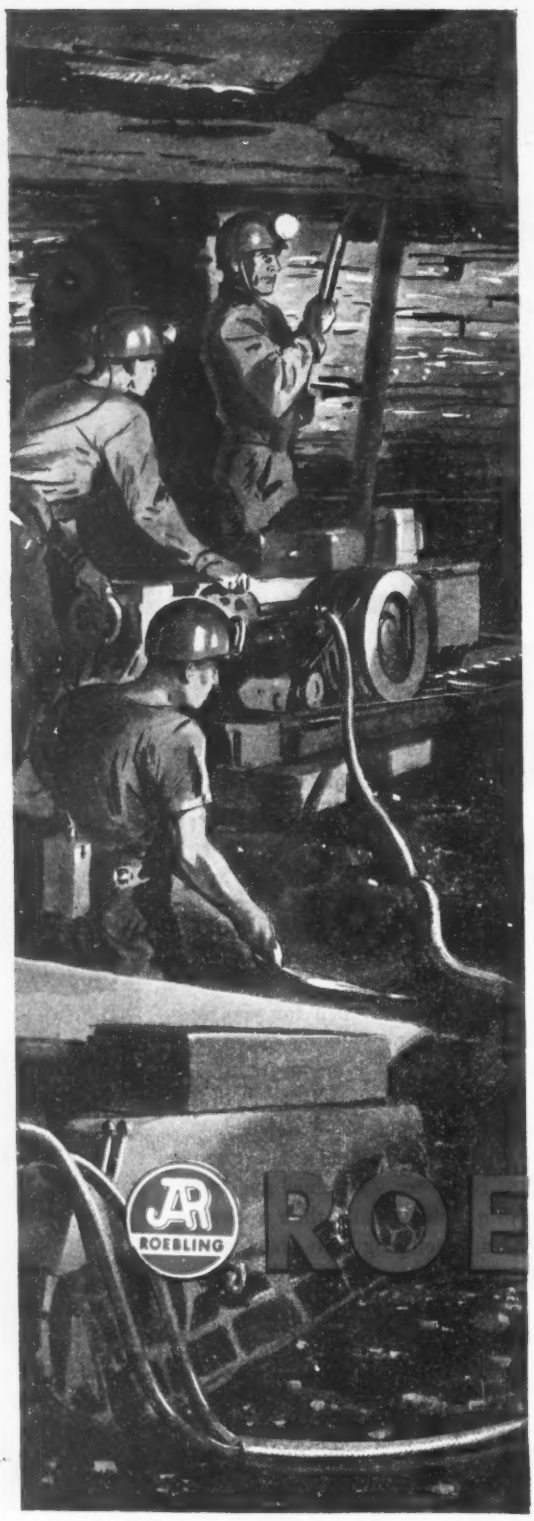
***SERVING THROUGH SCIENCE WITH*** **US** ***ENGINEERED RUBBER CONVEYOR BELTS***

# UNITED STATES RUBBER COMPANY

**1230 SIXTH AVENUE • ROCKEFELLER CENTER • NEW YORK 20, N. Y. •** ***In Canada:*** **DOMINION RUBBER COMPANY, LTD.**

# Tomorrow's Mines will *Modernize* Electrically

## CUTTING, HAULING, LOADING ...WITH POWER...SPEEDS TONNAGE




A MOST IMPORTANT REASON for the necessity of modernizing after the war is obsolescence, not alone in machines, but in methods.

More and more mines are mechanizing their drilling, cutting, gathering and loading—bringing greater efficiency to these operations, and—of growing importance — better working conditions, better labor relations. Very noticeable is the swing to the use of electric equipment for room and gathering haulage—such as the shuttle car, which runs back and forth from the room to the nearest haulage way, or the short, portable conveyors.

What do *your* modernization plans call for? Better maintenance of working voltages? Better ventilation? Pumping? Surface preparation? Or over-all mechanization? Whatever your requirements, let your electric company's local power engineer help you plan. His experience is *yours* for the asking.

And when Victory releases restrictions on the wires and cables you'll need, remember Roebling as *wire specialists,* ready to provide the right conductor for every job.

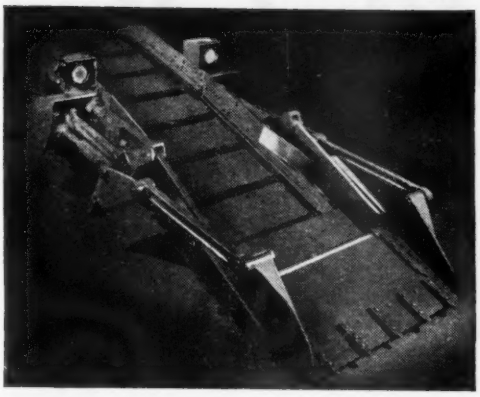
JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
*Branches and Warehouses in Principal Cities*




# ROEBLING

**PACEMAKER IN WIRE PRODUCTS**

Wire Rope and Strand • Fittings • Slings • Cold Rolled Strip • High and Low Carbon Acid and Basic Open Hearth Steels • Aircord, Swaged Terminals and Assemblies • Round and Shaped Wire • Wire Cloth and Netting • Electrical Wires and Cables • Suspension Bridges and Cables Aerial Wire Rope Systems



*The Loader With the Natural, Smooth, Easy-Shovel-Action Loading Head*

# The War Areas Aren't The Only Post-War Cleanup Jobs!

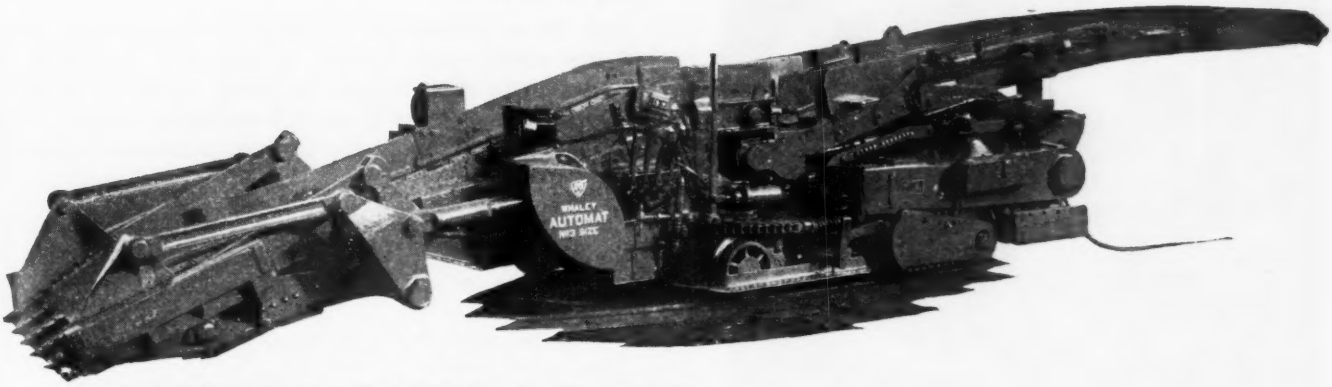
• In the post-war period, the rehabilitation and modernization of American Coal Mines is just as surely a "must" as is the cleanup job in the devastated war areas.

Of course, American Mines have not been flooded, nor have shafts and mining equipment been destroyed by armed enemies, but over-production and shortage of manpower have taken a heavy toll. Many mines now find themselves short on development, with pillars wrapped in falls and air courses choked.

To meet post-war competition these mines must be mechanized and cleaned up. And, it must be done without loss of production. This can be done most satisfactorily with the all-purpose Whaley "Automat" loading machine, getting maximum tonnage production at lowest cost on regular shifts, and using these same machines with skeleton crews on the off shifts for cleanup and development work.

In the Whaley "Automat", you have a loading machine that will handle any lump of coal that will pass through your tipple, or any size rock your cars, aerial tram or larry will take.

When asking for literature and full information on the Whaley "Automat", please mention your conditions. Myers-Whaley Co., Knoxville 6, Tennessee.

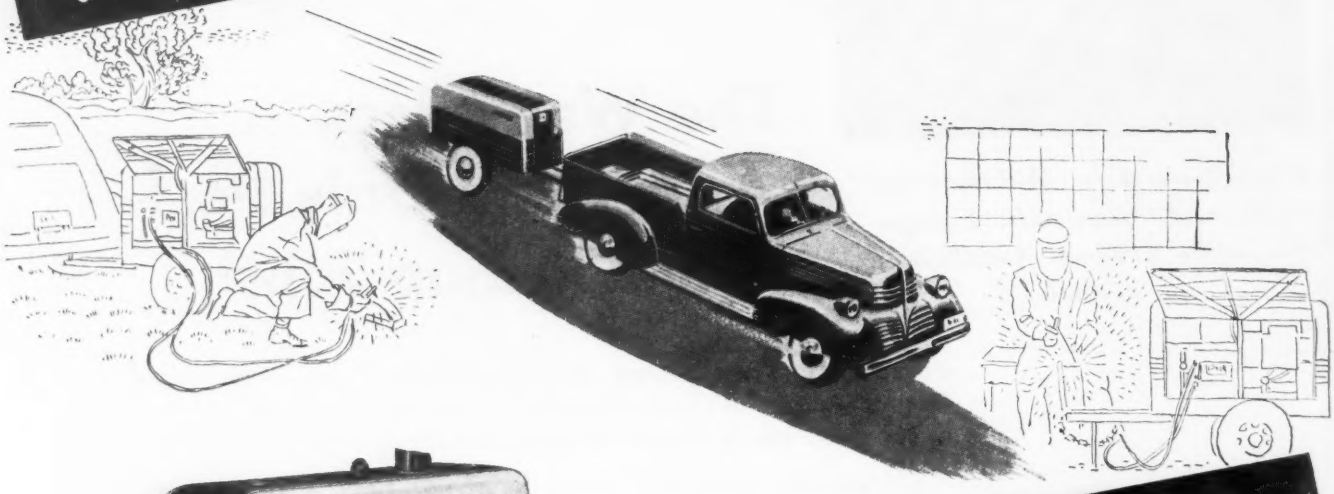



## ★ MYERS-WHALEY

***Mechanical Loaders Exclusively For Over 36 Years***

# Double Duty Welding

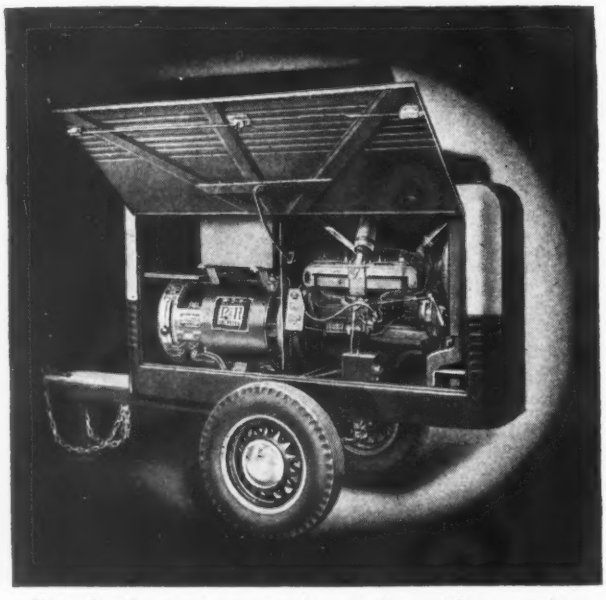
## . . . IN THE FIELD



## . . . IN THE SHOP




A sturdy, compact welding unit, completely styled and engineered for years of service.



Hinged side panels are easily raised, providing complete accessibility to generator and engine.

Whether the job is welding structural steels, metal fabrication or repair and maintenance work, it's a quick and easy matter with the P&H Engine-Driven Welder. It saves you time. It saves you money. It helps you keep machinery on the job. Broken or worn parts can be put back in service at a fraction of the time and cost it takes to replace them. With the independent power supply of its gasoline engine, it enables you to handle welding work in the shop or far afield, quickly and efficiently.

### Easy to Use

And the new P&H Trailer Welder is *easy to use.* With but one single heat control for any size and type of electrode you wish to use. Its WSR (Welding Service Range) rating of from 30 to 375 amperes, assures you of its *usable* welding current from minimum to maximum capacity.

*Units are now available for quick delivery. For complete information about them see your nearest P&H representative, or write us.*

*General Offices:* 4540 West National Avenue, Milwaukee 14, Wisconsin

**HARNISCHFEGER**
**CORPORATION**
ARC WELDERS • EXCAVATORS • ELECTRIC CRANES P&H MOTORS • HOISTS • WELDING ELECTRODES

# "ALLCASTEEL" SHEAVES

## PROLONG THE WORKING LIFE OF WIRE ROPE



Widely used, for more than 20 years, by leading mining companies throughout the United States and other countries, Vulcan Allcasteel Sheaves have thoroughly proved their money-saving superiority for every type of heavy-duty service. Cast in one piece, in our own steel foundry, they are accurately machined AFTER heat-treating to assure permanently accurate alignment.

Besides being extremely tough and strong they are so highly resistant to rope wear that the groove maintains its original correct shape indefinitely—thereby eliminating the destructive grinding and pinching of wire rope so often caused by soft, easily worn, sheaves and GREATLY PROLONGING ITS USEFUL LIFE.

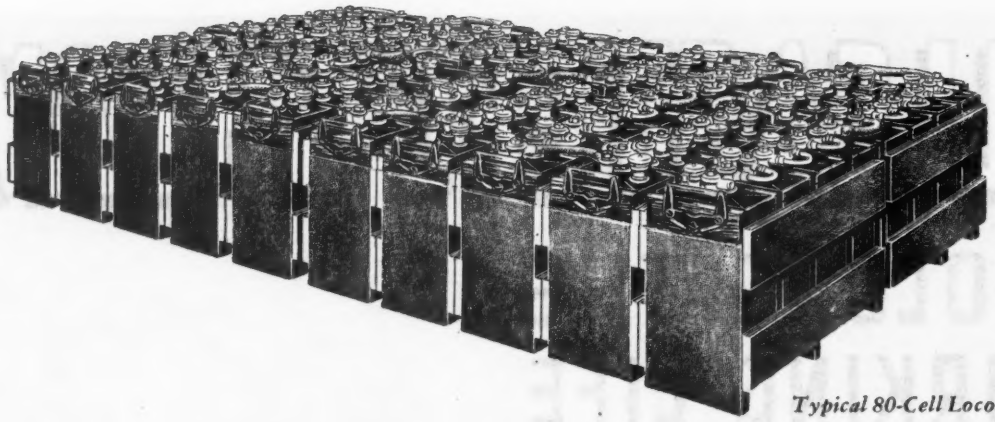
Vulcan Allcasteel Sheaves are available in any size—for vertical or horizontal mounting—with either plain or anti-friction bearings. Start now, to secure important future savings, by asking our experienced engineers to estimate on replacing your old-style sheaves with rope-preserving Allcasteel.

## VULCAN IRON WORKS

Established 1849

Main Office and Works **WILKES-BARRE, PA.,** New York Office 50 Church

| | | | |
|---|---|---|---|
| Heavy-Duty Electric Hoists | Shaking-Chute Conveyors | Steam Locomotives | Load-Carrying Larries |
| Self-Contained Hoists | Chain Conveyors | Diesel Locomotives geared and electric drive | Rotary Kilns, Coolers and Dryers |
| Scraper Hoists | Cast-Steel Sheaves and Gears | Gasoline Locomotives geared and electric drive | Crushing Rolls and Pulverizers |
| Car-Spotting Hoists | Cages, Skips and Gunboats | | Briquetting Machines |
| Room Hoists | Coal-Preparation Equipment | | Ball, Rod and Tube Mills |



*Typical 80-Cell Locomotive Battery*

# WHAT USERS DISCOVER

***In Mine Locomotives and Shuttle Cars Alkaline Batteries Give You These Important Advantages***

- They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They can **stand idle indefinitely** without injury, without attention, and without expense.
- They are **simple and easy to maintain.**



Ask a user of Edison Alkaline Batteries what he thinks of them as power units for locomotives and shuttle cars. The chances are he'll say they provide the closest approach to failure-free uninterrupted haulage power he knows of — and are economical, too.

He may at some time have had a wreck — such as a locomotive falling into a shaft or rolling down the side of a waste dump — and found that the battery not only survived with little or no damage but later went on and delivered full service life.

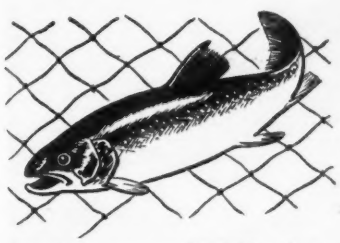
Or, he may have discovered that he can use "worn-out" motive-power batteries for various kinds of lighter-duty standby work for which their capacity is still ample, and thus can get more years of dependable service from them.

As a matter of fact, it is only by actually using Edison Alkaline Batteries that a person finds out how dependable and economical they really are. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J.*

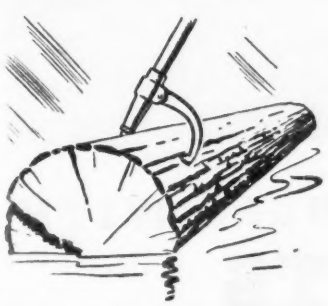
**Edison**
**ALKALINE BATTERIES**



In the "mining" of petroleum, as in the mining of many other ores and the production of aggregates, Cummins Dependable Diesels play a vital role. They power drilling rigs, trucks, shovels, dredges and many other types of equipment . . . have established an enviable record for reliable, low-cost performance on the toughest 24-hour-a-day jobs.



America's commercial fishing boats are bringing in record catches to meet record war-time requirements for fish and fish by-products. Many of these boats are Cummins Diesel-powered because fishermen everywhere know that the best assurance of being "first out and first back" is a Cummins Marine Diesel.



Basic in war and basic in peace is the vast logging industry of the Northwest. Here, the performance of Cummins Dependable Diesels in yarders, loaders, trucks and tugs explains why Cummins Diesel power is known among loggers as "the power behind CHEAP LOGS."



In agriculture and its many allied industries, Cummins Diesel power has innumerable applications. It is widely used in the West for irrigation purposes . . . in cotton gins, flour and feed mills, ice plants, dairies and many other places where its economy and dependability have been instrumental in increasing production and also decreasing costs.

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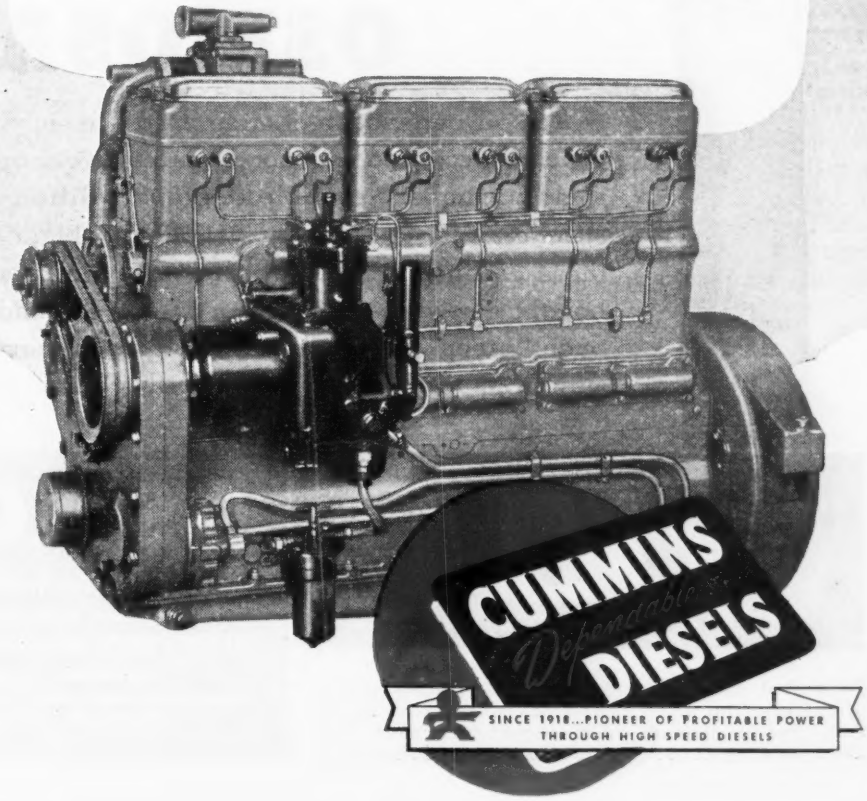
*Automotive models • marine engines for propulsion and auxiliary power • power units of all types • stationary engines • generating sets • locomotive models.*

# Backbone of every Basic Industry

In the "mother" or basic industries which produce the raw materials—agriculture, mining, commercial fishing and logging—and in the countless allied industries that play a part in the conversion of raw material into finished product, the development of the high speed diesel in 1932 went a long way toward changing modern concepts of power.

This diesel was a Cummins Diesel. Once and for all it struck away the shackles of excessive weight and size which had so long limited the use of diesel power. Once and for all it proved that diesel power could be applied to virtually any heavy-duty job and do that job—cheaper, faster, longer.

Since 1932, continued refinements in every phase of design, construction and material specification have produced still further improvements in the Cummins Diesel's operating economy . . . still further reductions in its weight and dimensions per horsepower. That's why operators and builders of all types of powered equipment—automotive, industrial and marine—have turned to Cummins for the dependable, low-cost power which is the backbone of industry. CUMMINS ENGINE COMPANY, INC., Columbus, Ind.



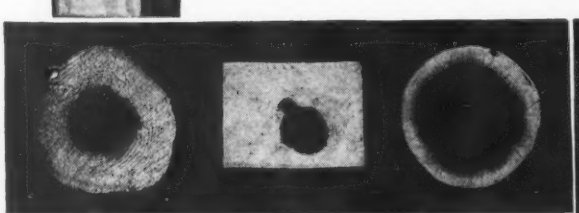



## TREAT YOUR OWN TIMBERS WITH

# OSMOSALTS

● A good percentage of mine properties are covered with good, usable standing timber...suitable for props, stringers and timber sets...yet often these essential mine supplies are bought elsewhere.

Such "green" timber, when treated with OSMOSALTS, will satisfactorily meet your requirements and reduce your operating costs as well. In addition to these savings, you will obtain dry, clean, odorless treated timbers which are both safe and easy to handle. Investigate. Write today for complete information and technical data.



Illustrated above are cross sections of three kinds of timbers. The white outer areas, which have been subjected to standard color reagent tests, show the deep penetration of the toxic chemicals in Osmosalts.

**OSMOSALTS**

*Nature's Method of Wood Preservation*

Composition and Process Patented and Patents Pending

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

GENERAL OFFICES: BUFFALO 12, N. Y.

BRANCH AND SALES OFFICES: BIRMINGHAM 3, ALA.; DENVER 2, COLO.; KENOVA, W. VA.; HARLAN, KY.; MT. VERNON, ILL.



# RECUPERATIVE POWER

GLASSKLAD *since 1925*

A strong heart is always ready to pump hard or idle gently, depending on the action required. When you rest, your heart rests. The length and vigor of life depend upon the recuperative power of the human system.

Properly designed storage batteries likewise must meet varying power demands and still recuperate rapidly. Special features like Black Oxide active material, Kathanode positive grids, and spun glass retainer mats provide Kathanode Glassklad Batteries with inherent characteristics giving them that vital recuperative ability.

The life, vigor, and performance of the battery depend upon maintaining that ability throughout its entire service life. You are sure of getting it in a Gould Kathanode Glassklad.

Write Dept. 912 for Gould Kathanode Glassklad Battery Catalogs: 200 for Mine Locomotive Service and 300 for Mine Shuttle Car Service.

**GOULD**

Since 1898 . . . THE BATTERY PICKED BY ENGINEERS

## THE GOULD UNIT-SEAL ENVELOPE

***One of a series of informative articles for users of industrial batteries.***

Gould introduced the Kathanode storage battery to American industry in 1925. Then, its spun glass mat protection was a revolutionary development in storage battery construction. Today, proved and improved, it is still the most effective method for retaining the useful active material within the positive plate.



First in this Kathanode Unit is the positive grid with each box-type pocket having a round central conducting member that is completely imbedded in the active material and this protected from the weakening effects of peroxidization.

Second is the spun glass mat. Made to Gould specifications, the mat positively retains the useful active material in place, yet is porous enough to allow an abundance of free electrolyte to reach the plate surface.

Third is the Gould Unit-Seal Envelope, for this Kathanode construction would not be complete without a practical method for holding the mat snugly against the positive active material. This Unit-Seal is a flat sheet of polyvinyl material with perforated sections making it 60% porous, but with solid vertical sections where the Envelope folds around the two plate edges. This eliminates the possibility of short circuits through treeing to adjacent negative plates. The Envelope, furthermore, serves as an additional separator insulation.

In assembling the Kathanode Unit, one of these Unit-Seals is laid out flat and the selvage edge coated with an acid resistant adhesive. Then in sequence a mat is placed over the central perforated area, next the positive plate, followed by another mat. The sheet is then folded over the mat to meet in the center where the adhesive makes a tight bond.

Thus is formed the Unit-Seal Envelope which encloses the positive plate with its two spun glass retainer mats—open at both the top and bottom, permitting minute spent particles to filter to the sediment chamber—all of which combine to make up the famous "Gould Kathanode Positive Unit."

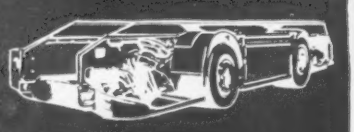
*For Excellence in storage battery production at Depew plant*

**GOULD STORAGE BATTERY CORPORATION, Depew, New York.** Factories: Atlanta • Chicago • Dallas • Depew • Leavenworth • Los Angeles • North Bergen • Rock Island • St. Paul • Sioux City • Zanesville

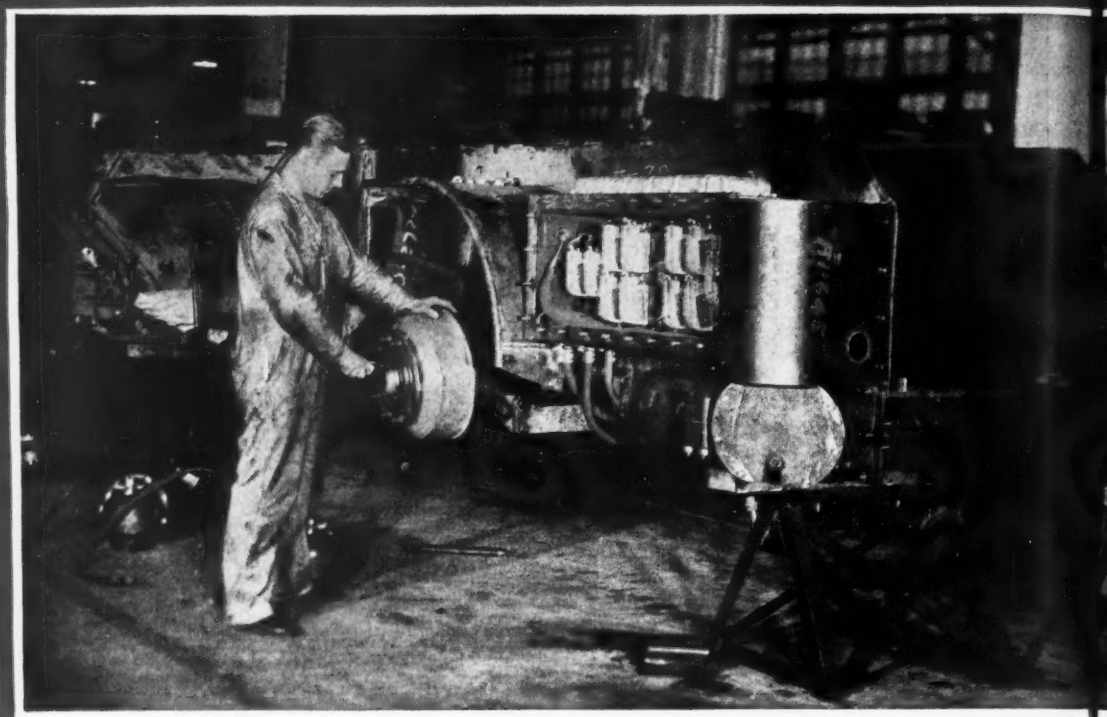
# Joy Builds Primarily for In

**Joy Shuttle Cars are rugged and dependable ... o**

**give volume section haulage economically ... ce**







Skilled craftsmen make Joy mining equipment to the exacting specifications set up by our engineers. Ruggedness and economy are placed first.

The six ton capacity of the Joy model 60-D Shuttle car pictured below makes it one of the most economical units in mines whose height permits use.

When b... a clear ... efficien... them fo...

**ALL JOY EQUIPMENT IS BUILT TO GIVE EAR...**



*Call in a Joy Engineer*



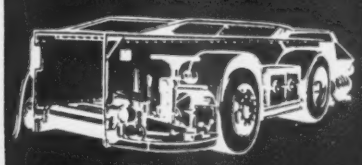
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**experts say "WORK WITH JO...**

# Inner strength-Ease of Operation

oy Loaders provide years of durabl serv-
ice, loading coal quickly at low cost p r ton.





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When being built, Joy Loaders present a clear picture of the strong, simple, efficient construction which makes them foremost in many mining fields.

This 11 BU. Joy Loader was built especially for loading hard rock and ores. It is a standard Joy model modified to meet our customer's specifications.



IVE EARS OF ECONOMICAL, EFFICIENT OPERATION





JOY MANUFACTURING CO.,
FRANKLIN, PA.

Loaders, shuttle cars, conveyors




# *Consider the Advantages of*
# ORANGE WAX CLOVER BRAND

Durable, flexible, unusually resistant to moisture penetration, burning with very little smoke and comparatively free from side spitting, Clover Brand Safety Fuse was a strong favorite for underground work for many years prior to 1933.

In that year this famous brand was made available with an *orange wax* finish, which protects the outside countering threads, preventing moisture absorption . . . affords a smooth, yielding crimping surface which provides a better waterproof joint between cap and fuse . . . gives better visibility in underground work . . . makes for even greater regularity in burning.

With all of these advantages it is not surprising that *Orange Wax* Clover Brand Safety Fuse has grown steadily in popularity. Perhaps it is the brand *best suited* for your work. The Explosives Company supplying your requirements will be glad to discuss this subject with you or write us.

Are you using the brand of Ensign-Bickford Safety Fuse best suited for your work? For instance:

| *If you have . . .* | *and now use . . .* | *we suggest* |
|---|---|---|
| Very wet work | Double Tape<br>Single Tape<br>White Clover<br>Beaver | Orange Wax Clover |
| Very wet work | Crescent | This is O.K. |
| Very wet work | Gray Charter Oak | Black Wax Charter Oak |
| Damp work | White Charter Oak | This is O.K. |

16

**ENSIGN-BICKFORD** *Safety Fuse*

SINCE 1836
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THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

# Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

**Ivan A. Given, *Editor***

**December, 1944**

## Is Regulation All?

WITH FOUR more years of the New Deal ahead, perhaps it is in order to think about what that might mean for business, including coal mining. The outstanding impression is the sameness of the federal executive and administrative machine. True, there was a little horse changing, with perhaps more to come, but a close look shows no major alteration in the philosophy that has animated the New Deal since it came into power (President Roosevelt, for example, still is plugging for his seven regional waterpower systems). The instrument chosen by the New Deal to put over its ideas—the federal courts, including the Supreme Court—has undergone no change and these courts are continuing to write laws with a will, in addition to showing themselves very amenable to backing up the claims of a growing number of federal agencies that they also have the right to make law.

All in all, the elements in the New Deal interested in expanding control over industry and making the people the servant of the State still are very much on the job and working hard. The Congress, although its New Deal and Democratic majority was enlarged, now stands as the best possibility for keeping the federal machine in check and thus preserving individual initiative and freedom.

The job is a big one, however, and success depends upon really constructive cooperation, assistance and support by business and industry. One way industry can help is to exert its best efforts toward solving its own problems and thus render unnecessary special protective or stabilizing legislation. Admissions of defeat and pleas for relief are not conducive to promoting confidence in industry's abilities in legislative halls, while even partial control or regulation always is an invitation to more. Perhaps, in the end, coal cannot avoid accepting some degree of federal regulation, but the warning that it first should exhaust all possible alternatives seems logical and timely.

## Time to Choose

AS THE DAYS go by, the conditions coal will have to face in the next wage negotiations become clearer. The operators will again meet one man armed with a new set of demands and complete authority; they can expect sympathy, if not active help, for the union in New Deal circles; they can expect a continuance of the public's demonstrated tendency to side with unions; and they can be sure that a stoppage will gain no friends. The whole adds up to a big responsibility on the representatives of the operators—and of the union—if a decision is to be reached that will be fair to both sides without a stoppage that would hurt everybody.

One thing, perhaps, can be said at the outset. Coal mining has a big stake in the maintenance of good will and the operators have been spending real money to develop and retain that good will. Since even a relatively short stoppage can undo much painful and expensive effort, and since the contract is a most important factor in the progress of the industry, it is logical that it should have the personal attention of the highest brackets in management and that any proposals to prevent stoppages not involving sacrifice of fundamental rights should be weighed most carefully.

Bituminous will be negotiating next time on an industry-wide basis and consequently the town-meeting plan appears even less likely to lead to a quick, fair settlement. On the subject of issues, incidentally, it would seem that the operators have a few items well worth presenting for the consideration of the miners' representative, such as honoring the agreement, a wage scale that is understandable, clarification of what constitutes work, and others. How far the operators will get with them, and with a fair resolution of the miners' demands, probably will depend a great deal upon how simple and flexible their negotiating organization is and how much authority it is permitted to exercise. The right answer to this problem means real progress. A small committee or one man seems most logical.

## Two-Way Attack

STORIES of increased competition in major coal markets continue to multiply. The latest is a study by the Philadelphia *Evening Bulletin* (Nov. 24 edition) showing that one-fifth of the families in that city using coal plan to change to other fuels. If that shift should occur, it would, of course, be a hard blow to anthracite, but there is good reason to believe that when the results of research appear in the form of actual heating equipment the picture will change. In the meantime, however, this and similar situations in other consuming markets served by both anthracite and bituminous pose some real problems. The solutions lie first in research and then in promoting the results of that research to the limit.

# THE COMPANY STORE

## Industry Asset and Good-Will Builder

A. McB. COLLEDGE
*President, National Industrial Stores Association*

### FUNCTION

To provide a reliable, friendly shopping center for coal mining company employees, where they may obtain real value for their money.

### VALUE

To the operator: (1) a handy, effective instrument for promoting better employee relations; (2) a legitimate source of company revenue.

To the employee: (1) a dependable source of supply at fair prices for all his needs and most of his luxuries; (2) a sympathetic institution which will extend a helping hand in time of trouble.

### PROBLEMS

To combat public misunderstanding of its aims, functions and business methods, and (2) to promote a closer degree of cooperation with coal-company management and a keener appreciation of its values and position.



THE COMPANY STORE has been the object of considerable criticism and condemnation, especially during the past decade. It has been misrepresented as an un-American institution preying on the employees of industry, who have been called its compulsory and unwilling patrons. This has been due, almost entirely, to a complete misunderstanding on the part of the general public of the real aims and purposes of such retail establishments.

Despite this handicap of being under frequent attack, the company store holds a useful and respected place in the coal industry. Functioning properly, it not only serves the employees as an economical and friendly merchandising outlet but it also provides the employer with one of his most powerful and handy instruments of public and employee relations. Operated efficiently, it is a source of *legitimate* income to the company.



**YOUTHFUL CUSTOMERS form part of the brisk business being done at this well-stocked coal company store at Welch, W. Va. Part of the store's contribution to better employee relations is courtesy and helpfulness, particularly toward children.**

To better understand the important position occupied in the economic structure of our nation by the company stores, or industrial stores, which is the more descriptive and appropriate term by which they are now identified, it is essential that the circumstances under which they were created be better understood. This article will deal not only with some of that background but also with the advances which have been made in merchandising methods and practices and the opportunity which these industrial stores have to serve both their customers and the coal industry.

It is unfortunately true that in some instances during the past some of the criticism to which industrial stores were subjected was justified. But what the general public does not seem to know is that in that same decade during which the industrial store received the most criticism and condemnation, it was also making the most progress toward correction of those practices for which it was being condemned.

The development of the industrial store closely parallels the development of coal mining. Over the years it has progressed from the first mean commissary, presided over by a part-time clerk and carrying a few items of essential foodstuffs, to a modern department store, operated by trained and skilled merchants and stocking as many as 17,000 different items. The 4,200 industrial stores in the United States last year did a billion-dollar business. Although operated in connection with a number of major industries, including the mining of ore and precious metals, steel, lumber and textiles, the great majority, or 67 percent, are operated in conjunction with coal mining.

### Location a Factor

The industrial store had its inception because coal, in the East at least, was found in isolated and, frequently, very inaccessible places far removed from those facilities needful for the comfort of the mine workers and their families. The mine operators quickly recognized that unless their employees were provided with fit and proper living conditions they could not hold them. So one of the first conveniences provided was a store at which food and other items of necessity could be procured. During the past ten years assertions have been made that the company store is not an essential part of our economy, that because it is seldom found in the Middle West or in England and Wales, there is no good reason for its existence anywhere. In the Middle West the country was settled before coal mines were opened, and towns existed near the mines. In England and other sections of the British Isles coal is found virtually on the main streets of the towns.

If the first company stores had their bad features, at least they accomplished one reform—the elimination of the itinerant peddler. These men worked the coal fields assiduously, with their entire stock-in-trade on their backs or on horses, and they charged what the traffic would bear. Often their prices were outlandish and many times their goods were inferior. These peddlers began to disappear with the advent of company stores.

The industrial store today employs the most modern merchandising methods, stocks many nationally known brands of goods, and sells at prices which are comparable to independently operated chains. Industrial stores of all types have an investment of $150,000,000 in buildings and real estate, $75,000,000 in store fixtures and furnishings, $500,000,000 in inventories. Their payroll in 1934 was $50,000,000. Today it is $65,000,000. They employ 5,000 executives and managers, 4,000 buyers and




**BARGAIN DAY on the main street at Holden, W. Va., as the ladies inspect the latest fashions in the $10,000 stock of Island Creek Coal Co.'s portable style center.**

department heads, 25,000 sales people, 4,500 clerical employees, 2,000 deliverymen and truckmen, a total of over 40,000 persons.

In the years in which industrial stores have progressed, their physical appearance as well as their volume of business and their business philosophy have changed. Most of the old shacks are gone. Some of the stores admittedly are still bad, but restrictions against new construction have halted many programs of improvement. Not all the fault of appearance was in the materials. It would seem sometimes that the architects who designed some of the company stores had previously built nothing but barns.

To realize how far the industrial store has come in the past 20 years it is necessary only to compare some of the former establishments with the modern structures erected by the Inland Steel Co., at Wheelwright, Ky.; Koppers Stores, the New River Co., the Federal Supply Co., the Union Supply Co., the Consolidation Coal Co. and many others.

My first contacts with industrial stores occurred when I was trying to collect installments for an automobile distributor on used cars from some of the "dead beats" in the mining towns. The store was the best place to find them and payday was the best time. The "dead beat" almost always claimed that the store took all his money, but frequently I was able to work out an agreement with the store manager to have the auto purchaser pay at least something each payday on his car.

In my 17 years of experience with Koppers Stores I have visited hundreds of industrial stores, good and bad, and I feel that I can speak with at least some measure of authority on conditions as they exist today and on the service which industrial stores are rendering both the industry and the miner.

Two factors have brought the company store to the important position it now holds. One was the realization, back about 1928, by coal-mine operators, that the store was no longer merely a necessary adjunct to the mining of coal but that it could and should be a profitable and service-rendering part of their enterprise. It is not too much to say that during the bad years around the early 30's the company store kept many a coal company from going under. As a result, companies began to expand their stores from simply a grocery and work-clothes market to the modern establishments which we have today, carrying hundreds of household items, even in some instances dealing in livestock. Today many of the top coal-mining companies have large and efficient company store organizations.

Naturally, with this expansion came a vast improvement in merchandising methods, such as mass buying and a large increase in the variety of stock, the savings and benefits being passed on to the customers.

The second factor in the improvement of industrial stores was the National Recovery Administration, and while it was a negative factor it still was an important one. A group of competitive retailers in Alabama were instrumental in having a "trick" clause surreptituously inserted in the Retail Code prohibiting the use of scrip and deductions from the payroll for employees' store accounts. This provision was aimed directly at industrial stores and had it ever become operative would have seriously handicapped if not completely eliminated such retail institutions. The operators of industrial stores were successful in delaying the application of this provision of the code until NRA died.

It was at that time that leaders in industrial store management realized that if the stores were to continue to exist, they would have to do a lot of cleaning up, both by precept and example. The real progress of the industrial stores dates from then.

## Criticism's Sources

Criticism of company stores has generally taken three principal lines—the handling of customer credit, prices, and variety and quality of stock. Some of this criticism has been vicious but much of it has been based on lack of information. Let's examine the record on all three points.

One of the most persistent criticisms has been the method of handling customers' accounts; in other words, credit. It is true that in some coal camps, in the past, miners were compelled, either through lack of other facilities or by company policy, to trade at the company store. This was even carried in some places to the point where trading at the company store was a condition of employment. No miner today is compelled by company order to trade at *any* company store. Obviously, there are still mining communities in remote places where no establishment except the company store exists. But with modern transportation that is becoming rare.

But perhaps the matter of credit has been the object of even greater misunderstanding than compulsory trading.

The practice of issuing so-called scrip for use at company stores originated because of two peculiarities of the coal mining industry, neither one of which was planned by the store or the company management. The first was that the average coal miner is ex-

ceedingly improvident and has a hard time holding on to his money. The second was the remote location of so many early coal mines.

To combat the first peculiarity, companies issued scrip as a medium of exchange, so that the miner would be provided with the means of buying food for his table. Had this not been done many a mining family literally would have been without food shortly after each pay period.

The second pecularity made it dangerous to carry large sums of money at the mine or store headquarters. A mining payroll is a large one and any sizable amount of currency in a section far removed from the normal law enforcement agencies was too great a temptation. In one instance, thieves removed the entire safe from a company office. It was found a year later, rifled and rusted, in a deserted gully. To prevent such occurrences, companies issued scrip for use at the stores, partly because many stores were so far removed from cities that daily or even weekly bank deposits were out of the question. Scrip was for full face value, very similar to the invasion money issued to our troops abroad. Many miners actually preferred receiving some of their pay in scrip, and it was certainly a blessing to their families.

In recent years, at least, company stores have made a practice of extending open credit, on much the same basis as independent stores. A miner's credit limit is established on the basis of this earnings and he cannot incur bills beyond it. There is no more of the evil of getting a miner so heavily in debt to the store that he can never work his way out. Federal regulations now prohibit payroll deductions beyond a certain percentage of the minimum wage, so that the miner receives at least some cash each pay period.

If all credit at company stores were stopped, companies would almost have to arrange to pay most miners every day of the week. They simply are not cut out to adhere to a strict budget of their expenses, and if they were unable to buy on credit at the stores their families and they themselves would suffer. Some so-called reformers say this practice should be eliminated. As usual, they do not know the facts. The miner wants to buy from the company store and *have his bill taken out of his pay.* A recent survey indicated that 75 percent of miners interviewed expressed a preference to buy large merchandise on the installment and payroll deduction plan, and 70 percent indicated that they wanted *all* their store bills deducted from their pay.

If it were not for payroll deductions, some of the womenfolk in the coal regions would not even see the pay envelope. There are, of course, exceptions to the rule that the miner cannot husband his money. The Scotch, Irish, Welsh and Slavic miner employees of some of the western Pennsylvania districts are among the shrewdest shoppers and most careful spenders in the nation. They want values before they will spend a nickel.

This same hard-hearted company



A. McB. COLLEDGE

***A. McB. Colledge probably is one of the leading authorities in the United States on the industrial store. He has been intimately associated with the National Industrial Stores Association for ten years and is serving his second term as president of that organization.***

***He was born and has spent his entire life in Allegheny County—in the heart of the western Pennsylvania coal fields—and is intimately familiar with the methods employed in the operation of coal company stores. Educated in the School of Business Administration of the University of Pittsburgh, majoring in economics and accounting, Mr. Colledge has been associated with Koppers Stores for seventeen years and now holds the positions of assistant treasurer and controller with that company. In connection with his work with Koppers and NISA, he has visited hundreds of industrial stores and has made special studies of their credit methods and practices. His work has taken him all over the country.***



WELL LIGHTED show cases display jewelry and haberdashery to advantage in the men's furnishings department of the Inland Steel Co. store at Wheelwright, Ky.

store they talk about is the only institution that I know of which will give an employee credit while he is engaged in a strike against the very company which operates the store. During the strike of 1939, some companies advanced credit as high as $300,000 to the miners. Many stores allow $2 a day to a married man and $1 a day to a single man when they are out of work or even when they are striking.

Another charge directed against the company store is that its prices are out of line with independent stores. With OPA ceilings in effect that charge is ridiculous, since even OPA found that company stores were obeying ceiling prices more rigidly than similar independent stores. But it was just as ridiculous before OPA.

The best answer to the charge of high prices is that company stores can and *do compete* on an even basis with independently operated chain stores which are accepted the world over as offering the lowest retail prices to their customers. One coal company operates stores profitably in the heart of Pittsburgh and another in a residential development just outside the city. Several of our own Koppers stores are surrounded by nationally owned chain stores and they outsell them all—and not just to coal miners and their families. The public trades there, and neither the public nor the miner can be fooled for long on prices. Industrial stores are proud that they can maintain these competitive price levels and still offer their customers extraordinary services. In addition, many of them face the unusual problem of transportation of merchandise to out-of-the-way places.

## Competition Welcomed

The answer to charges of high prices is found on the books of the average industrial store. We have thrived on competition. Volume has not been hurt by it—in many instances it has increased. Where competition exists eight out of ten miners still trade at the company store. Competition has put us on our mettle. We welcome it, and if we can't operate with it we don't deserve to be called retail merchants.

The third accusation by our critics is that the industrial store does not carry a large, varied volume of goods and that what it does carry is of inferior quality. Of any charge against the stores, this is most unfounded and unfair. It shows how little actual study the accusers have made of the situation.

The average company store carries 75 percent of its stock in nationally advertised brands. During the war the company store has been able to offer its customers a bigger volume of scarce items than the average independent store. Because of the huge volume which many of these stores can buy most of them have rarely been without red meat since the war started. The miner can't be fooled on his meat. Most industrial stores have made it a practice to deal with two of the largest packers in the country. Koppers Stores receives huge shipments of meat at its warehouses and distributes it by refrigerated truck, to be sure it arrives fresh and in sufficient quantity at the miner's table.



COMPETITION HOLDS no terrors for the modern industrial store. This attractive building houses the Koppers store at Keystone, W. Va. Next door is a privately operated variety store and in the same block are nationally owned chain outlets.

You could buy such scarce articles as cranberry sauce, bobby pins, canned fish, rubber boots and soap chips at industrial stores when you could get them no place else.

For some reason it always astonishes people who do not know to learn that miners demand quality in what they buy and that the industrial store furnishes it to them. One store stocked 500 fur coats at prices ranging from $100 to $500 and sold them all. In one season 10,000 fur coats were sold to miners' wives. One men's tailoring company in one season supplied industrial stores with 50,000 custom tailored suits which sold from $39.50 to $85. The biggest demand was in the $60 to $75 class. It is almost impossible to fit a miner with a ready-made suit. The average man's suit size is a 38-in. chest and a 34-in. waist. Because of the nature of the work he does, the miner's chest generally is bigger and his waist smaller.

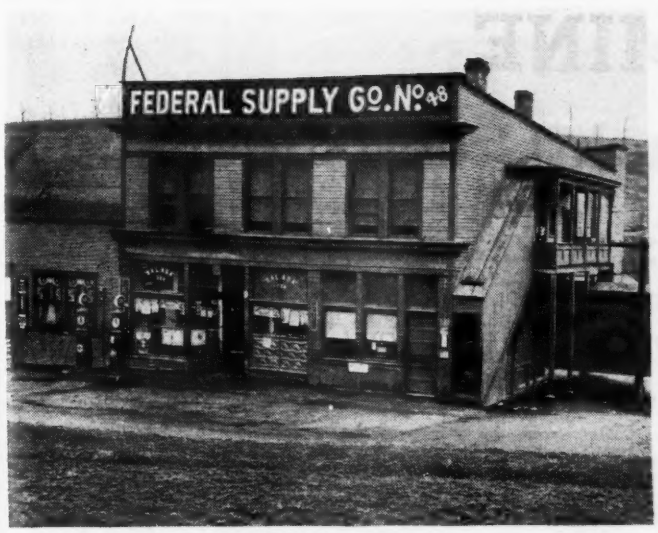
To demonstrate some of the range of stock in company stores, one large group of industrial stores alone last year sold 4,500 live pigs for a total retail value of $80,000 and 143,000 baby chicks for $18,000.

Success in keeping stocked with scarce items and having a wide range of merchandise even during wartime were no accidents. They were the result of good merchandising practice in foreseeing conditions and accumulating those items against the times of scarcity.

While credit practices, prices and stocks unquestionably are important, the proper gage of evaluating the position of the industrial store is the service which is rendered both to its customers and to the industry. Is it rendering a good and useful service? The answer is an emphatic yes, and I shall try to show why, both from the customer's angle and the operator's.

The industrial store today is offering the coal company employee services which he could not obtain any place else. He gets delivery service, liberal credit, the best merchandise available and a complete shopping center under one roof, all at prices which now even the greatest detractors of company stores admit are in line with similar establishments. The benefits of quantity buying, both in price and in range of items carried, are passed on to the coal-company employees. Where stores are too small to engage in quantity buying, plans are under way by the National Industrial Stores Association to make it possible.

Then there are extraordinary services which progressive stores offer their customers. Island Creek Coal Co., for example, has a truck stocked with $10,000 worth of clothing which drives right up to the customer's house







**BIG, MODERN structures are rapidly taking the place of the stores of yesterday. This progress is graphically shown in the contrast between the Federal Supply Co.'s Midland store five years ago and the attractive building of today. Many such modernization programs have been temporarily halted by the war, but are high up in postwar plans.**

with the latest metropolitan fashions, a tailor and a seamstress aboard. Koppers Stores' refrigerated truck brings meat to the front door—an important item when meat is scarce, since it traditionally forms the greater part of the miner's diet.

But probably more important than any of these features is the fact that the industrial store knows its customers generally by name and almost always by sight. It is not a cold-blooded, strange organization. Its employees and its customers are neighbors and often friends. OPA federal wartime regulations have compelled us to curtail some of our liberal credit practices, but in normal times most industrial stores do not impose carrying charges on installment purchases, and do not call the sheriff the minute a miner fails to meet a payment.

If a customer is sick, out of work, or for one reason or another he cannot keep up his payments on an icebox, we will work out any reasonable arrangement with him as long as we know he is not trying deliberately to defraud the store. Credit as long as three and four years, in normal times, is not unusual in such instances. If a retail dealer not sincerely interested in the miner's welfare but only in his profit had sold him the icebox, he would be down at his home the morning after he had missed a payment, demanding the money or the goods. We don't do that. The customer can keep and use the merchandise he bought from an industrial store as long as he shows good intentions.

It is only recently that coal companies have realized that the industrial store is a vital part of the coal industry. But still a great many of them do not understand that it is one of the best assets in promoting better relations with employees. The store employees, in a sense, represent management, and they come in contact with the miner and his family more frequently than any branch of management. As a result progressive stores have made it almost a religion to practice courtesy and helpfulness, particularly toward children, who in many cases run the errands.

The industrial store, properly conducted and having the sympathy and understanding of the coal operator, can be a fine public and employee relations adjunct to the company, since it can contribute materially to the contentment and happiness of the coal company employees.

Too often where the coal operator does not realize the importance which the industrial store plays in his relations with employees, it has been a failure of the store operator himself. Many of them do not have the background to be able to approach the operator and tell him a convincing story about the importance of the store. Many others are too timid either to tell the operator what they are doing or what they want to and can do to improve the service of the store. This is gradually being corrected by the employment of better and better men as store executives.

Nearly 80 percent of coal-company-operated industrial stores belong to the National Industrial Stores Association, yet it has been found that many store managers simply are scared to death to talk to the coal-company executives about the work the association is doing or how proper support by the company of the association means definite benefits to both. In such instances it is to the operator's own best interest to encourage suggestions and discussion about the problems and the future of the store which is part of his investment and has a vital place in the company's life.

Industrial stores have willingly contributed more than their share in the "Food Fights for Freedom" campaign. They have offered prizes at recreation centers and stimulated interest in campaigns for better health and living conditions.

The most important step in the future of industrial stores will be the efforts by our association to stimulate and facilitate pool buying. A committee has been formed to investigate every phase of this problem, and when it is solved it will mean that the company which operates only one or two stores will have nearly the same advantages in quantity purchases that the large organizations now enjoy.

The second step is the strengthening of our association, which throughout the war has maintained a complete reporting service to its members on the numerous regulations issued from Washington—an extremely important matter these days when a store manager has to be both a merchant and a lawyer. A strong association will give increased opportunity for the thorough discussion of mutual problems and will be able to help outline ways to solve them.

The future of the industrial store is closely allied to the future of the coal industry. The more help coal operators can give to making their stores successful, efficient and attractive, that much will they be doing to help their employees and themselves.

# MECHANICAL MINE
## Replaces Pruden's Back Creek Operation

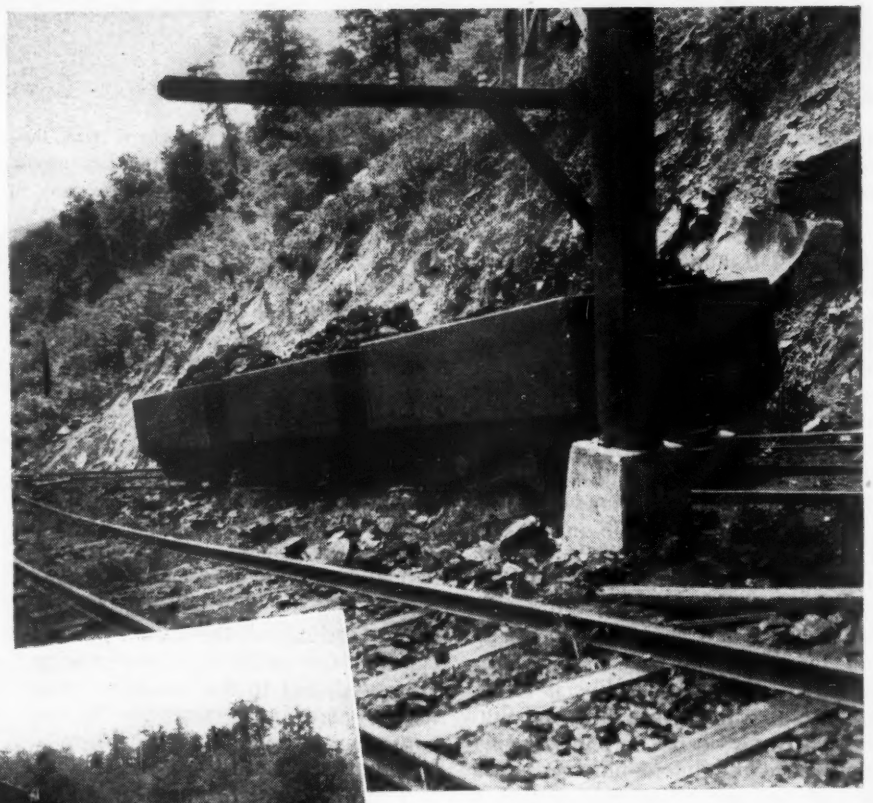
**Two Loader-Shuttle Car Units Average 250 Tons Each per Shift in 42-in. Rolling Seam—Drop-Bottom Mine Cars Provided With New Electrically Tripped Doors—7½-Ton Cars Used in Haulage**

By J. H. EDWARDS
Associate Editor, Coal Age

TWO UNITS, each consisting of one mobile loader and two shuttle cars, are regularly producing 250 tons apiece per shift in the 42-in. seam at the new No. 5 mine of the Pruden Coal & Coke Co., Pruden, Tenn. A standardized projection, almost similar for entries and room groups, systematizes mining. In addition to a mile of underground connecting haulway the new project, started in 1940 to replace the near-done Back Creek mine, involved construction of a car plane, headhouse, aerial tram for mine rock, mine office, lamphouse, shop and fan.

Prior to beginning the new mine, a 1,700-ft. aerial tram was built at the washing plant to dispose of washer refuse. New 2½-ton drop-bottom cars with an electrically operated automatic unlatching device handle the coal over the first lap of the rail haulage and other new drop-bottom cars carrying 7½ tons each complete the rail transit. The late Charles A. Griffith, former Pruden vice president, was the inventor of the drop-bottom car and his company made one of the earliest installations. He was the father of D. E. Griffith, president and general manager of the company.

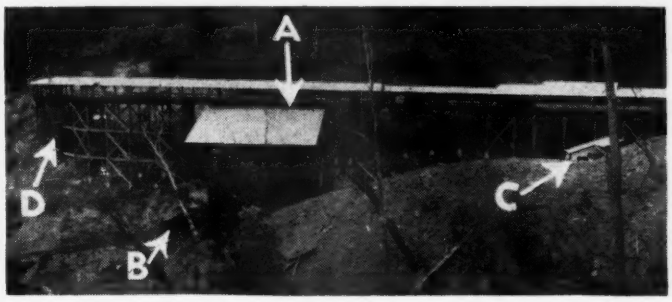
The old Back Creek mine was well equipped. It had a modern jig washing plant added to the existing five-track tipple of substantial design in 1935, Sanford-Day automatic drop-bottom cars, large-capacity dump bin and headhouse, and a smoothly oper-



Starting down the 2,000-ft. 12-deg. plane—25 tons of coal in 7½-ton cars.



Looking up the supply spur track toward the portal from a point near the loading chute at the top of the plane. Rope drum, mogentor and controls are in the building at the left.




Headhouse from which No. 5 coal is lowered to the level of the old mine for movement to the preparation-plant headhouse. Coal cars are dumped at "A"; "B" showss one of a trip of three 7½-ton tram cars at the top of the plane; "C" is the top of the drum house in which the 300-hp. mogentor is located. The aerial tram for mine rock takes off under the dump hopper at "D."



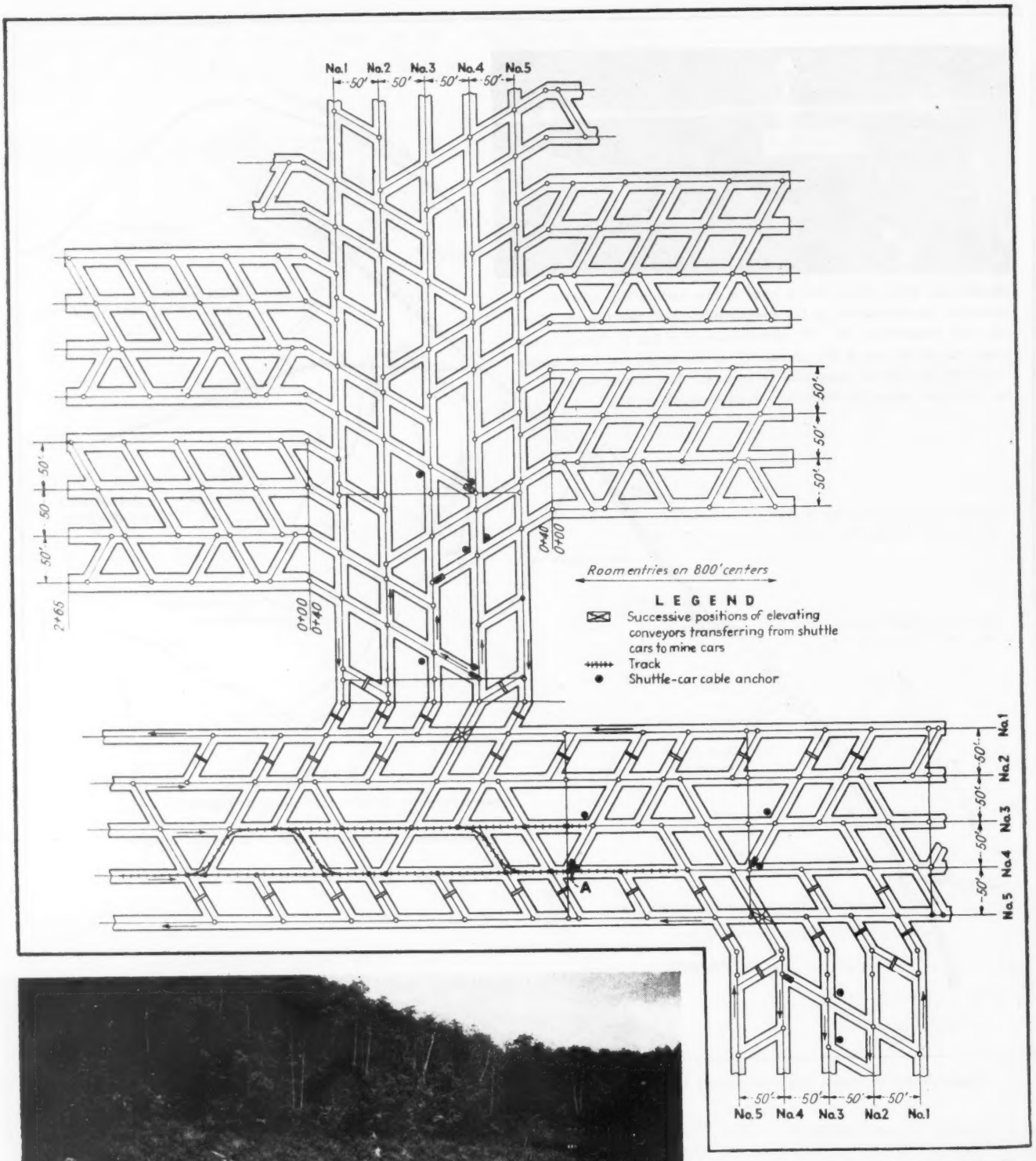

Although not to scale, this plan shows the location of the Pruden preparation plant in relation to the new No. 5 mine.

ating monitor plane. Addition of the refuse tram in 1938 brought the plant to its present status. The tram, equipment for which was furnished by J. R. Hoe & Son, Middlesboro, Ky., is a reciprocating double-bucket unit, 1,700 ft. long with two towers. Although Pruden was an early user of shaking conveyors, duckbills and mobile loaders in handling coal and rock in low coal, the waning Back Creek mine was being operated on hand loading when development started on the new operation.

The No. 5 acreage is in the Hignite seam some 580 ft. higher than the Mason seam of the Back Creek mine. In general this new territory lies to one side of and not above the Mason seam workings. For this new mine it was deemed advisable to continue using the existing preparation plant, monitor plane, original headhouse and a mile of the old outside main-line haulage. However, a new lamphouse, mine office, shop and other service buildings were constructed in the head of a hollow on Little Creek, made accessible by a new ½-mile automobile road branching from the Pruden-Middlesboro (Ky.) paved highway.

For the main-line haulage of 11,500 ft. from the headhouse of No. 5 to the headhouse of Back Creek mine, 33 Sanford-Day 7½-ton automatic drop-bottom cars equipped with Fafnir ball bearings were purchased. The first section of this new large-car haulage is the 2,000-ft. 12-deg. gravity plane from the new headhouse. While a trip of three empty cars is traveling up the plane, a trip of three loads is traveling down, a trip of 15 is en route on the round trip to the Back Creek headhouse and the other 12 cars are at the bottom of the incline.

For regenerative braking, speed control and occasional spotting, the rope drum of the gravity plane is geared to an Allis-Chalmers 300-hp. 2,300-volt motor with General Electric contactor control to act as a "mogentor" (*Coal Age*, June, 1942, p. 66). Ordi-



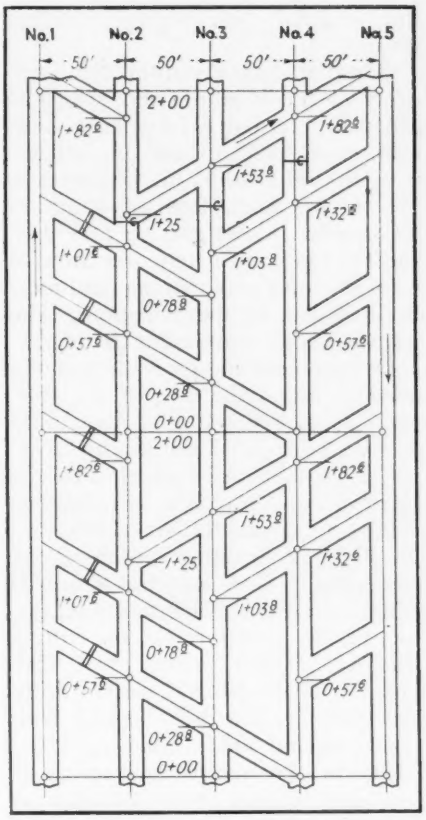

Entry and room layout for mobile loading and shuttle-car gathering. The typical track layout is shown when the cars are dumping at "A."



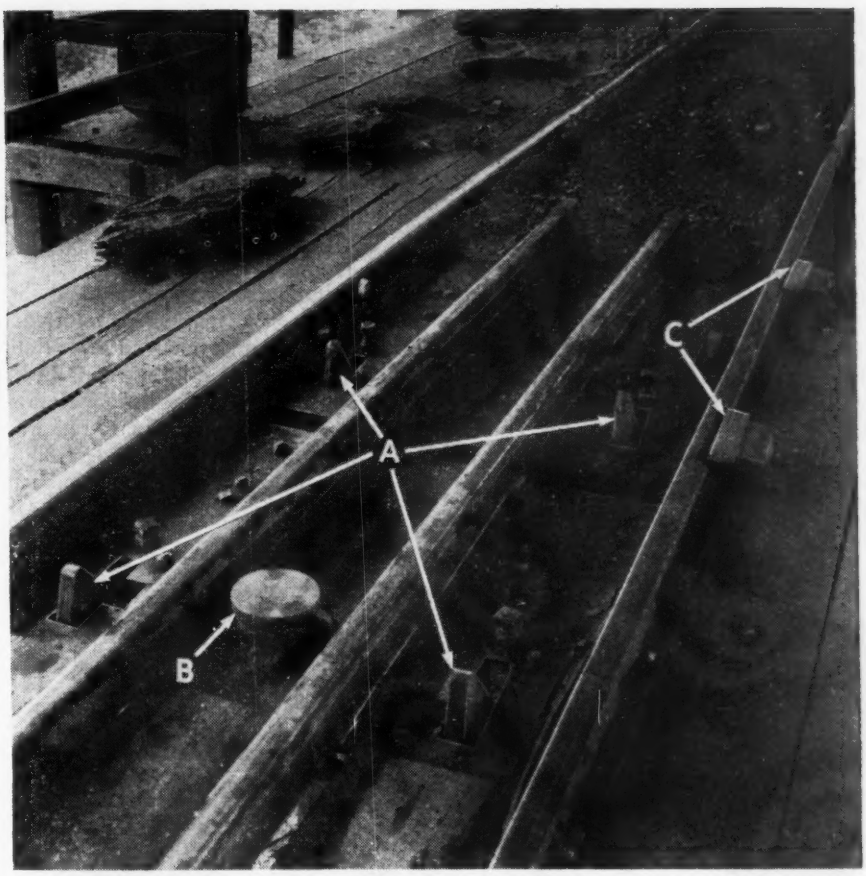
The new mine office, lamphouse and shop—all of double-brick construction—are built where the haulage is above ground for a few hundred feet at the head of Little Creek.

narily no power is used and the regeneration to the mine power line is 180 to 200 kw. The drum brake and undercut gate for loading the 7½-ton cars are operated by compressed air from a new Sullivan compressor, Type WL-71, size 4½x4½x4½ in.

A 7½-ton car is filled at one spotting. Skillful operating in spotting to exact position and manipulation of the gate makes this possible. Side-




**Foremen are supplied with this working plan for entries and crosscuts.**



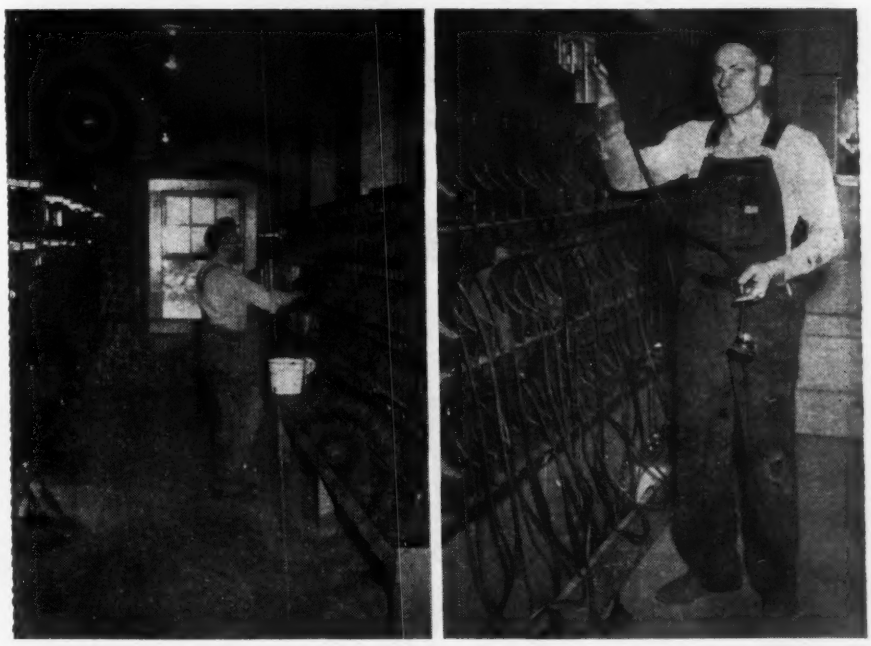

**Automatic unlatching device for the new-type drop-bottom cars. "A" designates the dogs which rise to engage the door-unlatching hooks under the car; "B" is the top of the solenoid that does the raising and "C" designates the treadle switches.**

boards and a drag bar fixed to the headhouse structure above the car prevent spillage and act to pull the coal into the back upper corner as the trip is inched down the track to spot the next car.

Trip speed on the 12-deg. plane is 1,200 f.p.m. and the ropes are American Steel & Wire 1⅛-in. 6x19 Seale-patent plow-steel-quality Laing lay with hemp center. Three years' operation has proved the plane and equipment a highly efficient layout. Mine rock dumped from drop-bottom cars into a separate bin at the new headhouse is carried to a refuse pile by a single-bucket aerial tram of 1,100-ft. span. It extends across an adjacent hollow and is without towers.

New car equipment at No. 5 consists of 100 Sanford-Day automatic drop-bottom units, also with Fafnir ball bearings. In use with them are 30 of the old automatics from Back Creek mine. The newer ones, carrying an average of 2½ tons mechanically loaded, were put into service in August, 1942, and constituted the first large installation of the "knockout" type. This feature is Sanford-Day's improved unlatching device, eliminating from the side of the car the old arm which had to be raised by hand or by a fixed device along the track to trip the doors.

The doors are tripped by a dog mechanism mounted between rails. The dog is raised by an electrical solenoid energized when the front and rear wheels of a car depress two treadle switches simultaneously. Locomotives, being of a different wheelbase, do not close both switches at once and hence do not cause the dogs to elevate. When cars loaded with mine rock are to be dumped to the aerial tram bin, which is farther out on the headhouse, a control switch is opened



**The lamphouse is operated on the self-service postoffice plan. At the right, Hughie Petrey, in the outer corridor, gets his lamp to go on shift. Back of the rack at the left, Lon Braden, lampman, replaces a charged and serviced battery.**

by the dumper to prevent their being dumped into the coal hopper.

Mine buildings at the Little Creek opening of No. 5 are double-brick construction. The lamphouse, now equipped with 250 new style Edison Model P lamps, has a self-service post-office-type rack. The workmen do not have access to the back of it and the lamphouse attendant need not go out in front.

The main section of the shop is 30x60 ft. and is equipped with a bridge crane. The concrete motor pit with stairs at one end has several special features (p. 124 of this issue).

Ventilation for the new mine is supplied by a Jeffrey 6-ft. Aerovane fan, V-belt driven from a Fairbanks-Morse 40-hp. ball-bearing motor—an old unit and larger than necessary but the only motor readily available.

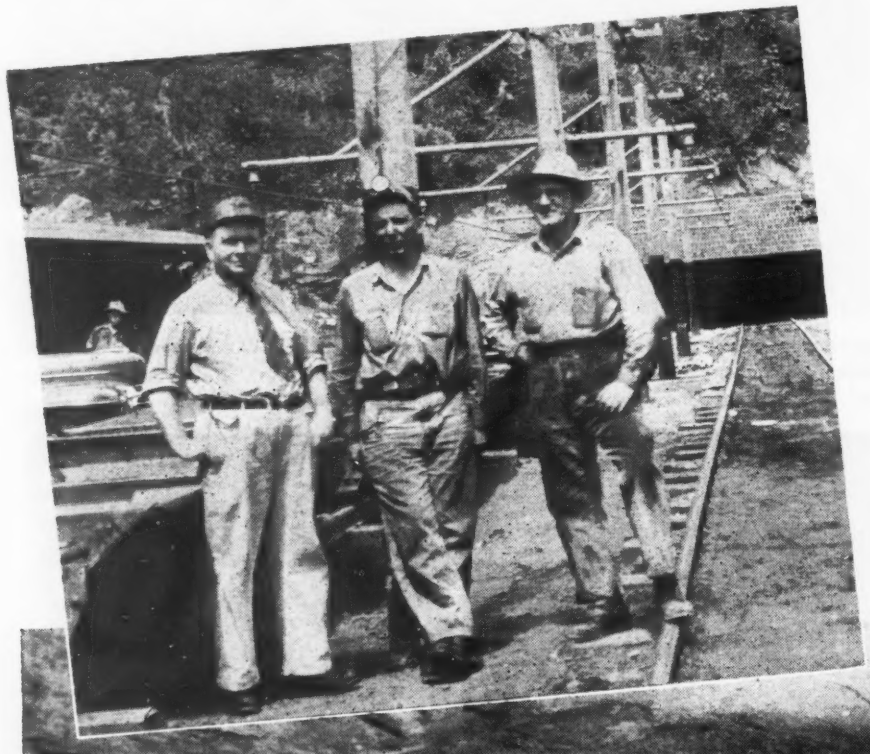
Power is purchased and direct current (at 275 volts) is supplied by an outside substation located near the shop and consisting of two 200-kw. General Electric synchronous converters with automatic reclosing circuit breakers on the d.c. feeders.

Main-line haulage is handled at present by two Jeffrey locomotives, one 10-ton and one 6-ton. Rail weights are 65 lb. on the main lines and 45 lb. on the cross-entries. Bonds are long type with terminals for arc-weld application with steel electrodes on all permanent track. On temporary track wedge-type bonds are used. All line materials and bonds are Ohio Brass.

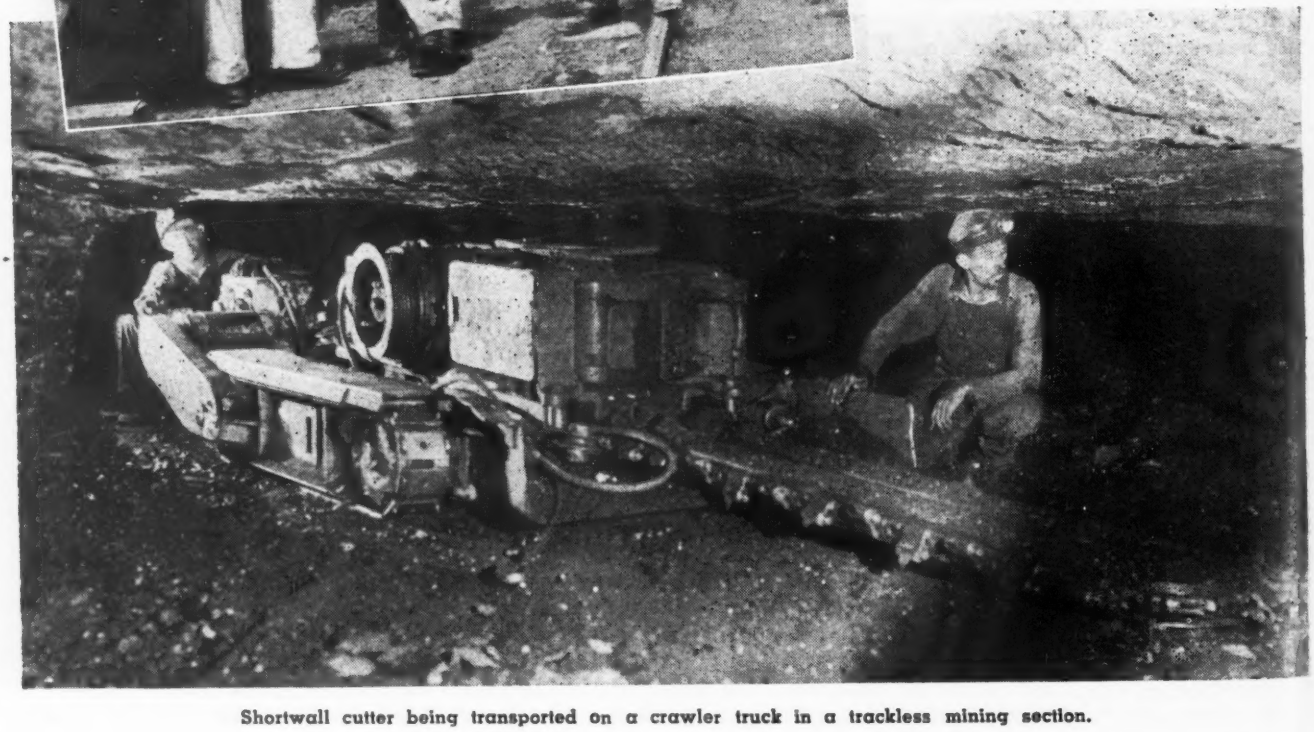
Range of thickness in this No. 5 territory of the Hignite seam, which is generally level but has numerous local rolls, is 38 to 48 in. and the average is considered to be 42 in. Character of the bottom ranges from sandstone to soft fireclay. Cover goes up to 450 ft. and the top immediately over the coal is for the most part a strong sand rock. Rolls of slate are the exceptions. The seam is free of continuous partings.

Development and production equipment in use at the time of this writing was as follows: two Joy 14BU loaders; 4 Joy 32E7 shuttle cars carrying 2½ tons each, 2-wheel drive, 2-wheel steer, with reels accommodating 500 ft. of 2-conductor No. 6 cable; two Joy PL11-5E elevating conveyors; one Goodman 112DA universal shortwall cutter; one Jeffrey 35BB shortwall; two Joy T2-4E crawler trucks for cutting machines, 500-ft. cables; two Chicago Pneumatic No. 472 electric drills; and two Pruden drill buggies with cable reels and 500-ft. cables (p. 120).

The two Joy loaders, each served by two shuttle cars, were installed in November, 1943. Due for delivery in November, 1944, were two more loaders, four more shuttle cars and two elevating conveyors which, when put into service, will make the Pruden operation completely mechanical. The



**At the daylight opening on the No. 5 haulage on Little Creek—left, D. E. Griffith, president and general manager; C. G. Cross, superintendent; and H. A. Page, chief mechanic.**



**Shortwall cutter being transported on a crawler truck in a trackless mining section.**



**Average output of a mobile loader and two shuttle cars in the 42-in.-thick Hignite seam in No. 5 mine is 250 tons per shift.**

Back Creek mine will be shut down and all hand loading discontinued. Shaker conveyors, which were used in much of the entry driving before loading machines were installed in the new mine, will be kept for miscellaneous entry-driving work.

As indicated by the two drawings of the mining plan, five 16-ft. headings are driven abreast with 60-deg. crosscuts to develop all entries—main, cross and room. The elevating conveyor is moved ahead 200 ft. each time. With this system 500 ft. of shuttle-car cable proves ample and no difficulty is experienced by tangling or crossing of the trailing cables. Loads and empties take right and left routes and the only waiting by the empty is the time required for a load to move to the first crosscut, a maximum of 100 ft.

With 350 ft. of sidetrack maintained on the center of the five headings and with three crossovers from the main line, or loading track, locomotives can switch to the back end of the empty trip and thus be on the head end of the loaded trip. At the time of this writing haulage from the farthest development was 4,000 ft. to the Little Creek portal and a total of 8,800 ft. to the new headhouse.

Room entries are driven on 800-ft. centers and rooms are turned both ways. The system in room advance is the same as in entry development. The 37½-ft. pillars between the groups of four rooms are not pierced with crosscuts on the advance. Pillars will be taken when retreating from a group of rooms and the unpierced barrier will be mined.



**Coal being transferred by elevator from shuttle car to mine car.**

The 16-ft. working places are shot with two holes loaded with Herco permissible explosive. A unit crew consists of twelve men: one foreman, two machinemen, two drillers, two shuttle-car operators, one loading-machine operator, one loading-machine helper, two scrappers and one boom man. The small amount of timbering required is done by the scrappers. Units operate two shifts with 15 minutes between and the range of production per unit is 200 to 400 tons—average, 250 tons.

Experience has indicated that in this mine the shuttle cars can operate in coal 36 in. in thickness.

Greasing of loaders and other working-section equipment is done exclusively by the maintenance mechanics. Many points of the loaders are greased during shift and the balance is done during the interval between shifts or after the second shift.

At the washing plant no mine-run is crushed. The large sizes are hand-picked and the 2½x0-in. is washed in a Jeffrey diaphragm jig. In a continuous centrifugal dryer made by Centrifugal & Mechanical Industries, Inc., the ¼x0-in. fraction separated on the dewatering screens is reduced in surface moisture from 18 percent to 6 percent.

F. W. Butler is assistant general manager of the Pruden Coal & Coke Co., C. G. Cross is superintendent; E. B. Cross, mining engineer; H. A. Page, chief electrician, and R. W. Underwood, foreman of No. 5 mine.

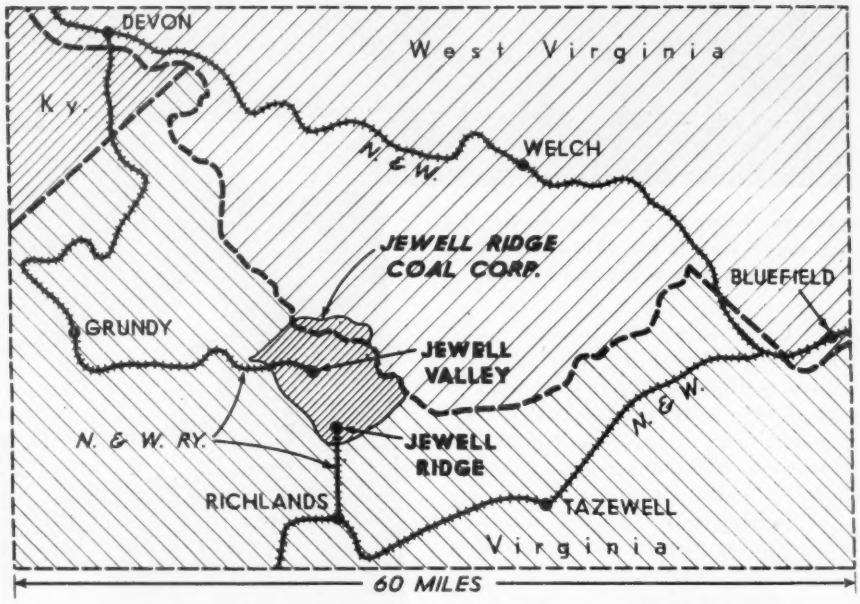
# HELPING MAN AND FAMILY

## Keynote of Jewell Ridge Relations Work

Benefits to Employees Goal of Personnel Department Created in April, 1943 — Producing Over 1,000,000 Tons Annually, Mines Are Far From Towns Over 3,000—Numerous Physical Improvements Made

By J. H. EDWARDS
Associate Editor, Coal Age

CLOSE RELATIONSHIPS can result in friendlier feeling or contrariwise, create distrust. Any coal-mining company that must furnish housing and other town facilities for its employees has a very close relationship with them—and also an opportunity. When the property is distant from towns of a size offering good shopping and amusement facilities the relationship is even closer. That fits the case of the Jewell Ridge Coal Corp., Jewell Ridge, Va. Labor shortages normal to the war period, together with the travel restrictions imposed by conservation of rubber and gasoline, have stimulated executives of the Jewell Ridge company to increase efforts toward making their towns better places in which to live and raising the employee's esteem of his job. To coordinate and expand these efforts for boosting employee morale the company created in April, 1943, a personnel department which is achieving good results and giving mine officials more time for production problems.

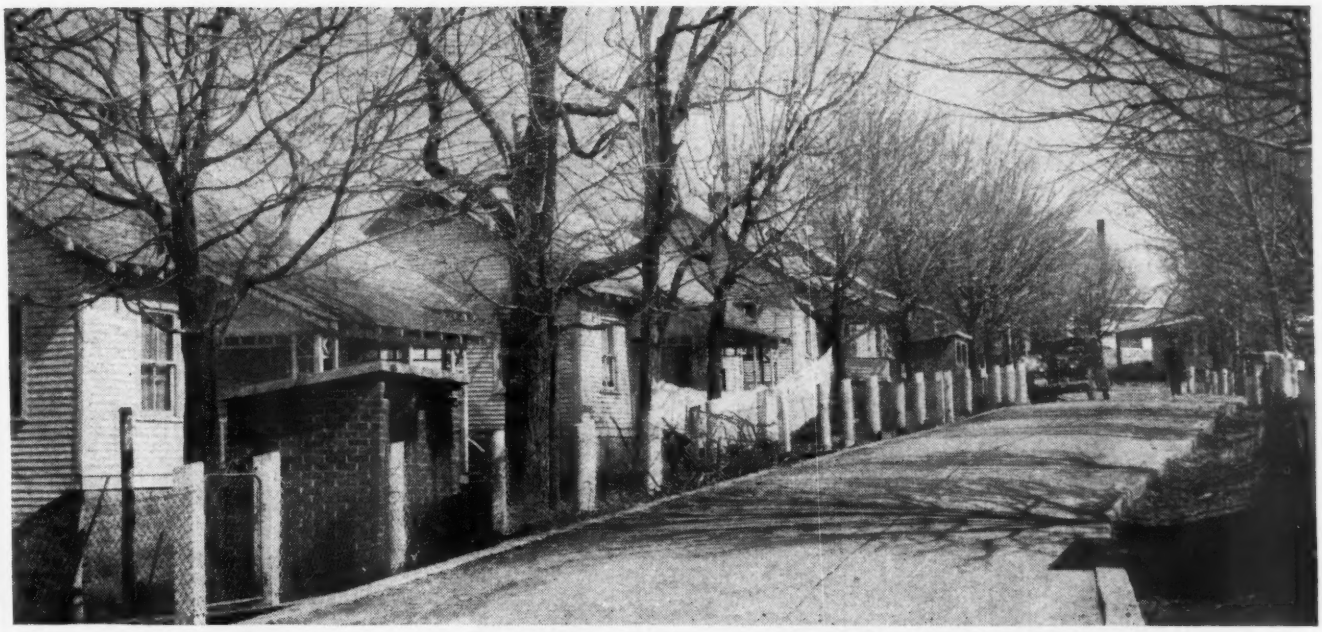



**The Jewell Ridge property is off the beaten path. Mountains and circuitous highways increase the distances to larger communities.**

Jewell Ridge mining history began in 1901, when the late George W. St. Clair, father of Dr. Huston St. Clair, who now is president of the company, obtained options on 110 tracts of land in Tazewell and Buchanan counties, Virginia, and McDowell County, West Virginia. These areas, purchased the next year, comprise most of a tract of over 20,000



**Jewell Ridge comprises one street 3,100 ft. above sea level. In the valley (arrow) is the central maintenance shop near No. 1 mine.**



**Paved street, shade trees and white-painted houses make Jewell Ridge a clean, pleasant community.**

acres now owned or under lease. Seam thickness is 40 to 50 in. and the coal is a low-volatile type of high quality.

Jewell Ridge No. 1, the older mine, which produced 553,000 tons in 1943, ships on the Clinch Valley division of the Norfolk & Western Ry., while Jewell Valley No. 2 mine, opened in 1936, which produced 501,000 tons in 1943, ships the opposite direction over a branch line serving the Upper and Lower Buchanan fields and connecting with the main line of the N. & W. at Devon, near Williamson, W. Va. Jewell Ridge, operating headquarters of the company, is 8.6 miles by paved highway from Richlands, Va.; population 3,000. Jewell Valley is 22 miles via paved highway from Grundy, Va.; population 4,000. The two company towns are connected by a 16-mile paved road. Out beyond Richlands, the next larger towns most accessible to Jewell Ridge are Tazewell, Va.; 31 miles, 4,000 population, and Bluefield, 55 miles, 20,000 population.

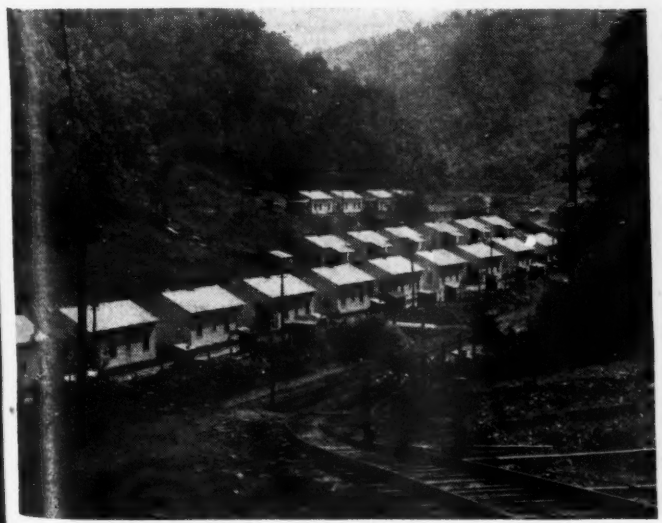
The company generates its own power at a 2,000-kw. steam-turbine plant built in 1932 on the Clinch River at Richlands (*Coal Age*, March, 1934), and distributes the power at 13,000 volts to transformers and substations.

Employees of the company, including section foremen and the force in a central repair shop at Jewell Ridge, number 1,025 (not including those employed in the stores and offices).

At Jewell Ridge the company has 172 single houses and at Jewell Valley 35 doubles. Many of the employees live at some distance from the mines. During the period of gas rationing and other shortages affecting transportation the company provides free transportation for its employees. For this purpose it owns and operates four buses and pays several employees to operate buses to and from work.

Living 3,100 ft. above sea level, residents of Jewell Ridge enjoy a summer climate ranking with the popular mountain resorts of the State. Not only is the town at high elevation but it is strung out on top of a narrow ridge where every house gets a breeze. There is but one street, this paved with concrete and flanked with a row of houses on each side. Shade trees in front yards complete the picture.

Except for experimenting with conveyors a few years ago, the mines have been on hand loading. Now the personnel problem is changing somewhat because of the introduction of mobile



**Four-room miners' houses in the upper end of Jewell Valley.**



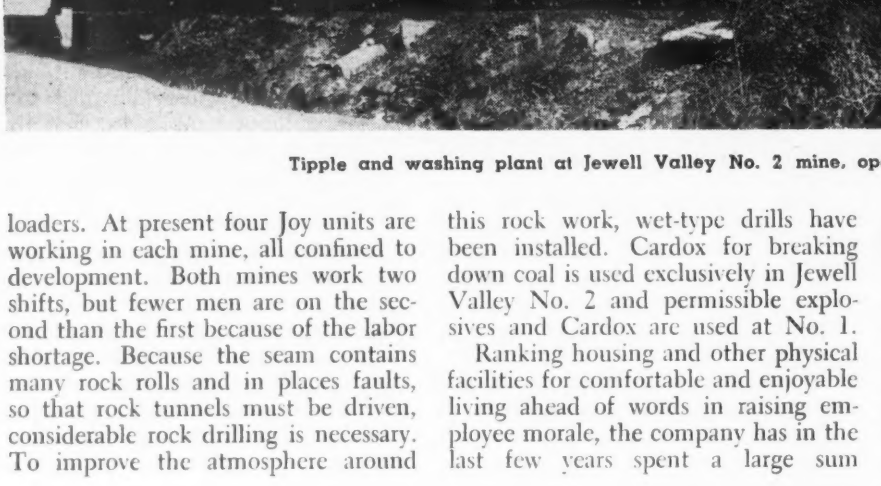
**Clubhouse at Jewell Valley affords pleasant living for boarders.**



**Tipple and washing plant at Jewell Valley No. 2 mine, opened in 1937.**

loaders. At present four Joy units are working in each mine, all confined to development. Both mines work two shifts, but fewer men are on the second than the first because of the labor shortage. Because the seam contains many rock rolls and in places faults, so that rock tunnels must be driven, considerable rock drilling is necessary. To improve the atmosphere around this rock work, wet-type drills have been installed. Cardox for breaking down coal is used exclusively in Jewell Valley No. 2 and permissible explosives and Cardox are used at No. 1.

Ranking housing and other physical facilities for comfortable and enjoyable living ahead of words in raising employee morale, the company has in the last few years spent a large sum on outside improvements, including houses, recreational facilities and a new church.



**Modernized living room in one of the houses for officials at Jewell Ridge.**

Houses are maintained in first-class condition, including frequent coats of white paint, which keeps them looking new. Absence of multiple tenement buildings known as miners' flats is a feature of the towns. Recognizing that with added responsibility placed on a man he deserves improved housing, homes of officials, while they may be the same as others on the outside, are finished on the inside as far as possible to suit the tastes of the individuals. For single men and other boarders first-class clubhouses are maintained at each mine.

To those who know, a supply of pure, soft water is considered a tremendous living advantage. Zeolite softening plants are in use at both mines, the one at Jewell Valley having been started Jan. 1 of this year. Mechanical equipment in that plant was furnished by the Roberts Filter Mfg. Co., Darby, Pa. At Jewell Valley, softening is necessary the year around because the raw supply is a hard water from deep wells. At Jewell Ridge, however, the normal supply is a surface water, naturally soft, which is treated and filtered. Necessity for treatment comes in periods of light rainfall when part or all of the supply must be taken from deep wells producing water high in iron and salts. These are removed by the zeolites,

# The Jewell Journal

VOL. NO. 2. JULY 27, 1944 NUMBER 17

## War Time Production of Coal is Amazing

From Pearl Harbor until Incasion Day more than 1,050,000,000 tons of bituminous coal have been furnished to American industries alone. The Bituminous Coal Institute reported today, which have been the primary source for the production of 140 billion kilowatt hors of electricity, 200,000,000 tons of steel, power for haul-

## Road Resurfacing Through Jewell Ridge

By the time the Journal appears a new surface will have been placed on the present road through Jewell Ridge.

The work is being done by the Pendleton Construction Co., of who were awarded the contract to surface the road between Jewell Ridge and the present "hard top" road at Dismal River via Chicken Ridge.

class I roads in this section.

After having digressed from the road through Jewell Ridge to the Chicken Ridge road we will get back by saying that it is none too soon for this new top to be placed on the Jewell Ridge road. Due to war time conditions beyond the control of the Jewell Ridge Coal Corp, not even necessary repairs to the road could

## One Typical Example of Co-operative Spirit

Although Jewell Valley had already oversubscribed its $15,000.00 Bond quota in the Fifth War Loan Drive, yet in the spirit of cooperation with the overall effort of Buchanan County the officials of Local Union 7327 of the Jewell Ridge Coal Corp. at that place arranged for additional purchases Thursd— afternoon at

**A community newspaper promotes interest and provides data on the latest developments at home and abroad.**

thus maintaining quality the year around.

Since the spring of 1943, when a new office and store building was completed, the inhabitants of Jewell Ridge enjoy shopping facilities superior to those in most towns of several thousand population. Under one roof are sold groceries, meats, clothing, drygoods, furniture and hardware. The convenience (self-service grocery department), orderliness and spotless conditions are reflected in general morale.

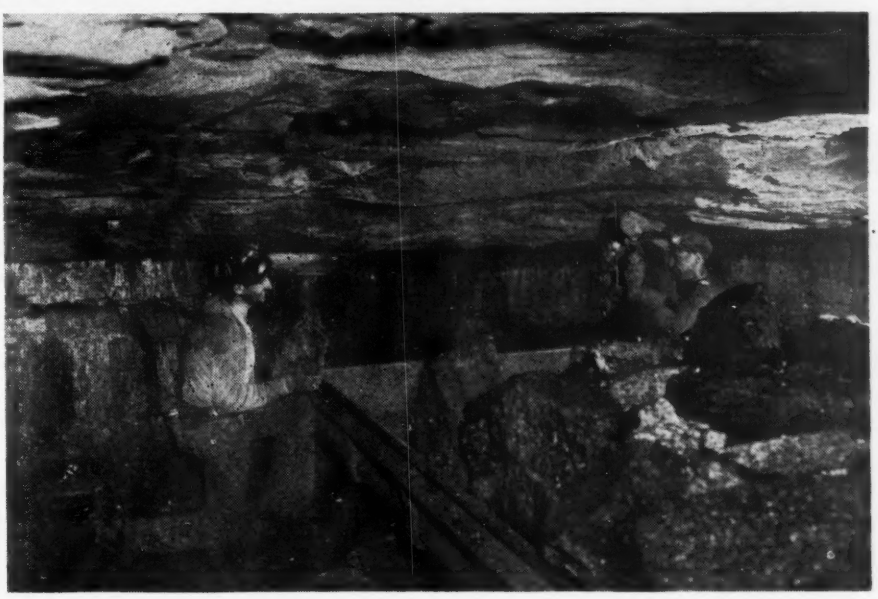
The building is a colonial brick, two stories with basement. At one end the department store occupies the basement and two floors. The remainder of the building is taken up by the payroll office for No. 1 mine (first floor) and the offices of the general manager, general superintendent and engineering department (second).

Across the street a recreation building has been established and a new gymnasium building recently completed. The first floor of the recreation building has in the front a grill and soda fountain done in red floor tile and red-trimmed gumwood fixtures and in the rear a four-lane bowling alley. The basement is fitted out for the Boy Scouts. Even the postal facilities of the town have been improved by the recent modernization of a small building which affords ample space for lobby and workroom.

For employees who go in for outdoor games, excellent shuffleboard and horseshoe courts have been built adjoining the office and store building. The units are separated and bounded by low brick walls with stone copings. The public-school ground, which is on the only sizable flat area in the



**The Jewell seam is 40 to 50 in. thick. Here, O. W. Wright, section foreman, Mine No. 2, looks on while Robert Burress and Luther Street cut a room face.**



**Henry Horton (left) and Henry Smith hand loading in a room in Jewell Valley No. 2. New mobile loaders, four at each mine and recently installed, are now on development.**





**Above: Bath house at Jewell Valley. The front wing (entrance) has a room for selling miners' supplies and serving sandwiches and coffee. Left: The new Jewell Valley community was not long without a church.**



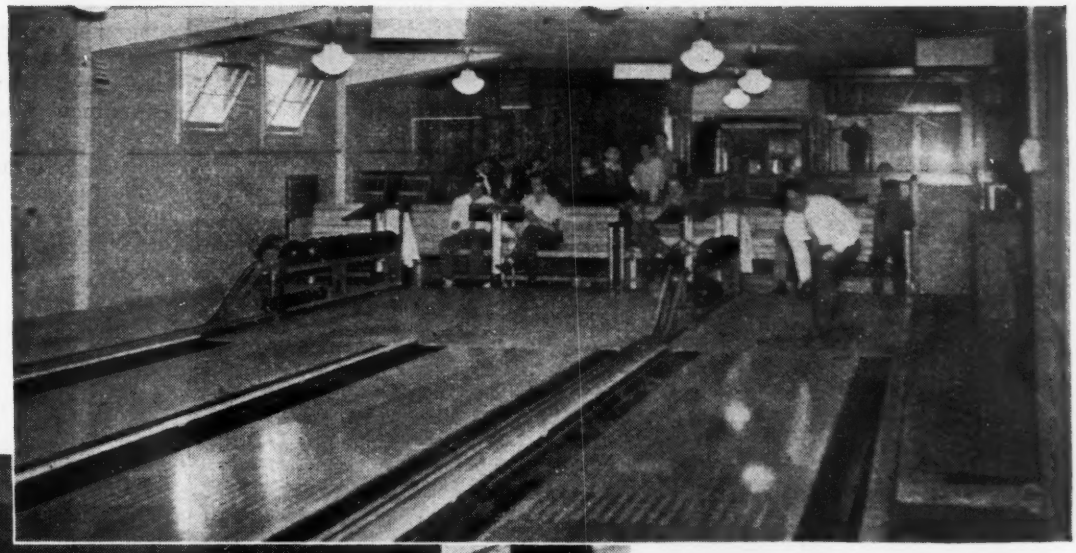

**Good water is appreciated. This plant at Jewell Ridge and a newer one at Jewell Valley use the zeolite system.**

town, affords a diamond for soft ball.

Characteristic of the management of the company, a good church was erected at Jewell Ridge many years ago and the new town of Jewell Valley was not long without. The church was built before the theater, which is now nearing completion. This No. 2 mine has already been equipped with a modern bathhouse of brick and concrete construction. A wing at its entrance provides a room to be used as a store where working supplies such as gloves will be retailed and where coffee and sandwiches will be served.

At each mine the company maintains a small receiving hospital with operating table, beds and so on. The one at Jewell Ridge has an X-ray. A nurse working full time and paid entirely by the company is available to these hospitals. Serious cases are taken 8.6 miles to the Clinch Valley Clinic, a modern and well-equipped private institution at Richlands. Until a year or so ago the company employed three doctors. Now, because of the shortage of physicians, one is burdened with the whole task. For his services the married men pay $2 per month and the single men $1.50

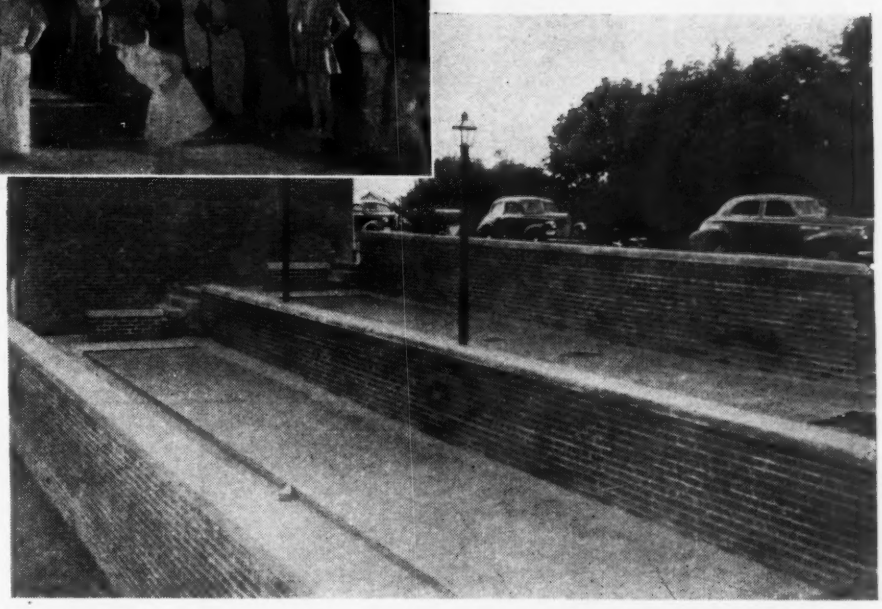
Hospitalization at the clinic costs $2 per month regardless of size of family. The company maintains a dental office with full equipment at Jewell Ridge to which a dentist from Richlands comes one day a week. The Jewell Ridge company makes available to its employees group insurance paying $750 to $1,750 at death and $18

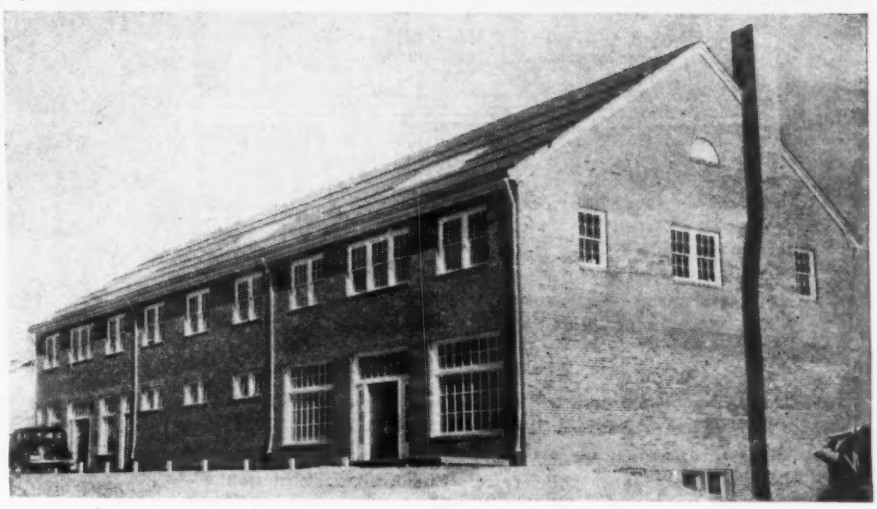


Bowling costs but 15c. a line and the company sponsors a league and awards merchandise prizes.



Below: Shuffleboard courts are next to the office building at Jewell Ridge. Not shown at the left are horseshoe courts. Left: A recreational director paid by the company conducts a public-school class in the company's gymnasium. Bottom: New store and office building at Jewell Ridge.





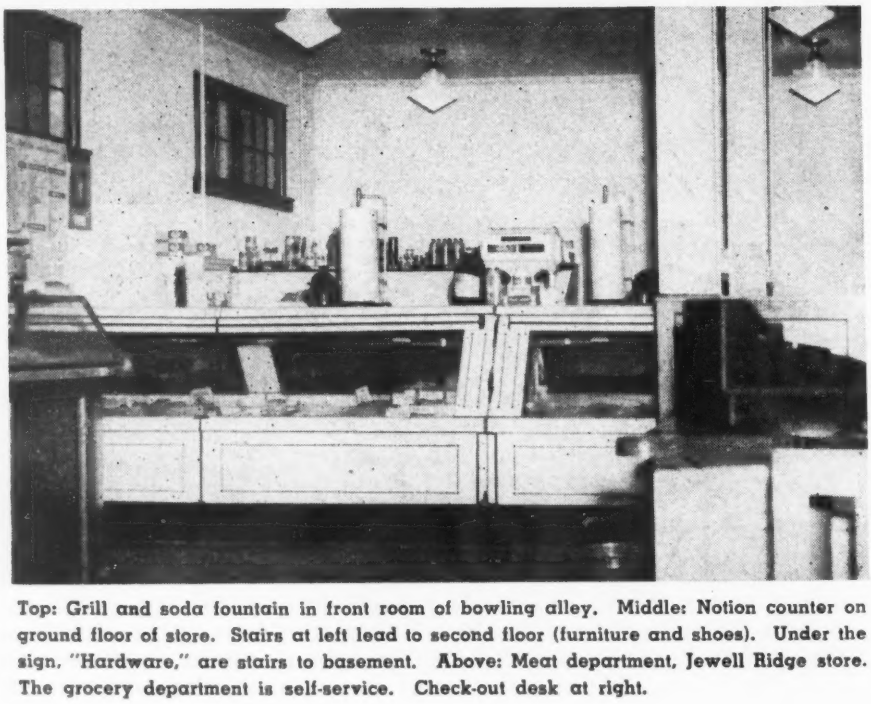
weekly for non-occupational accidents and illness. The company participates in the cost of this insurance. There also is a local death benefit association which provides burial expenses.

The personnel department, established in April, 1943, is under direction of J. Howard Miller, who has been with the company in various capacities since 1936. In addition to hiring all employees, maintaining a case history or work record for each, and handling compensation claims, this department renders free service in all problems of rationing and issuing (gasoline, tires, stoves, kerosene, shoes, groceries, explosives), helps soldiers' and sailors' dependents get allowances, aids in obtaining birth and marriage certificates and maintains a War Bond sale and issuing station. Most other activities to help employees and boost morale stem from this department.

Mr. Miller is editor and supervisor of the Jewell *Journal*, a company newspaper, which was started in November, 1942, and is published twice a month. Usually it consists of four pages, size 10x16½ in. Editorials concentrate largely on promoting safety, calling attention to the war-time aims of rais-







Top: Grill and soda fountain in front room of bowling alley. Middle: Notion counter on ground floor of store. Stairs at left lead to second floor (furniture and shoes). Under the sign, "Hardware," are stairs to basement. Above: Meat department, Jewell Ridge store. The grocery department is self-service. Check-out desk at right.

ing production and to the duties of patriotic citizens. News and pictures of "Jewell's Fightin' Men" occupy a prominent place in the journal.

For conducting physical education classes in the public schools and helping employees and their families in all types of physical play, a full-time recreational director, C. M. Brown, is employed and paid entirely by the company.

A plan is under way to supplement the school teachers' salaries with the object of obtaining and holding the best teachers in the State. It is the intention to employ them twelve months of the year. During vacations of the public school they will conduct adult training classes, children's Bible classes and supervise the playground.

In each town the salary of a full-time director of religious education is paid by the company. In addition the company supplements the salaries of the pastors of the two churches. The affiliation is Presbyterian but denomination is minimized and all are welcomed. That the churches are Presbyterian traces back to the affiliation of the family of the company founder.

A parent-teachers' association is fostered and Mr. Miller has served several terms as president. Wives of officials of the mining company sponsor a garden club, of which Mrs. Miller now is president. Victory gardens of employees last year were awarded a certificate of merit by the Victory Garden Association. Troops of Girl Scouts and Boy Scouts help to keep the youngsters busy. The company sponsors a bowling league, giving merchandise prizes to the winners.

## Safety Department Separate

Until recently two full-time safety inspectors for the two mines worked under direction of the operating management. Now a separate safety department is being organized and there will be an inspector for each mine and a safety director who will report directly to the general manager.

For the decade from 1931 to 1941 compensation costs of the company averaged 3c. per ton. On April 1, 1942, the executives made an agreement with the men that starting May 1, 1942, they could have what could be saved below that figure. It was agreed that the first money, if any was saved, would be paid Jan. 1, 1943. For Jewell Ridge No. 1 mine it was to go to the Employees' Mutual Benefit Association and at Jewell Valley No. 2 mine to the Jewell Valley Employees' Burial Fund. For the period May to December, No. 2 mine won $3,996, check for which was presented at a pit-mouth meeting by Dr. S



**The basement is devoted to hardware and miscellaneous items, neatly displayed.**

Clair. Loss of many active younger men to the armed forces, employment of inexperienced men and related wartime factors unfortunately have prevented the miners from earning awards during 1943 and the first half of 1944.

Because of a progressive manpower shortage in the general locality, benefits of this recent broad program of equipment improvements and employee morale building are difficult to evaluate. Executives can only guess in how much poorer position as to total production and cost the company would be if town facilities had not been improved and the personnel relations allowed to drift. One tangible result from children's activities is evident. A few years ago damage to property, mostly broken windows, averaged $150 per month. Now $5 per month will cover that item.

Humphrey D. Smith, residing at Bluefield and with offices at Jewell Ridge, is general manager of the company. James A. Hagy is general superintendent and C. F. Howard, chief engineer. At No. 1 mine H. R. Lovell is foreman and at No. 2 that position is held by John R. Shortridge. J. C. Nestor is chief electrical engineer in general charge of electrical equipment and maintenance.





**Right: Some of the Jewell Ridge officials. Left to right, J. Howard Miller, personnel manager; C. P. Howard, chief engineer; H. D. Smith, general manager; James A. Hagy, general superintendent; and Clay Thompson, safety inspector. Above: Dr. Huston St. Clair, Jewell Ridge president, presents the men of No. 2 mine with a check for $3,996 representing compensation-cost savings.**

# "COAL FOR VICTORY" DRIVE EARNS AWARDS FOR MINES

## Hundreds of Mines and Collieries Expected to Be Eligible for Production and Efficiency Awards—Early Filing of Qualifications Urged, With Deadline for Mailing Fixed for Jan. 31

### STILL A JOB TO DO

*A statement on the coal outlook*

by CHARLES J. POTTER

Deputy Solid Fuels Administrator for War.

**During the past year the coal industry in the United States has been put to the severest test which it has ever been called upon to meet. Beset by increasing difficulties at every turn, lack of manpower, scarcity of material and regrettable scattered work stoppages, it has nonetheless been confronted with the need for producing more coal than ever before.**

**The industry has met that challenge in commendable fashion. But the war is not yet won. The need for coal to meet military and civilian demands remains great, and only by exerting the utmost effort can the industry fulfill its obligations. That effort will require both the skill and the cooperation of all those within the industry, operators, supervisors and miners.**

**We, in government, realize the problems which have confronted the industry during the past year and have done our best to help.**

**Obviously the major problem was one of production, of getting out enough coal to supply the record-breaking demands of war industry and at the same time to fill all essential civilian needs. Without the productive achievements of the coal industry our military requirements could not have been met and our citizens might have known hardship or even distress.**

**In helping to solve the problems which faced us we have had the hearty cooperation of the industry. Certainly not the least of the contributions made to greater production this year has been COAL AGE's "Coal for Victory" award plan, offered with the support and cooperation of the Solid Fuels Administration for War. I trust and believe that a large number of the nation's mines and collieries will be the deserving winners of these honors.**

WITH COAL living up to its promise of making 1944 a record-breaking year in tonnage, January, 1945, should find numerous mines eligible for "Coal for Victory" awards. COAL AGE salutes the coal-mining industry of the United States for real achievement in production for war, and urges every operating company to check its records and enter every mine and colliery for the awards to which it believes they may be entitled. The "War Production Efficiency Award" is for mines which have increased their output per manshift 10 percent or more and the "Victory Production Award" is for mines which have increased their tonnage 6½ percent or more in 1944, and both are offered with the support and cooperation of the Solid Fuels Administration for War. Similar awards will be made to each member of the supervisory staffs at winning mines or collieries.

The year 1944 was eventful and important for coal. The industry was called upon to produce more tonnage than anyone had previously thought possible with the reduced manpower left it by military demands. It responded by mining coal at a record-breaking rate to meet the ever-increasing demands of war and civilian requirements.

The "Coal for Victory" awards will single out meritorious achievement in 1944, but the purposes for which they were created—stimulation of war production and the promotion of efficient operation for the future—are even more vital in 1945. War pays scant heed to calendars and the demand for every ounce of production will continue for many months after the 1944 "Coal for Victory" award winners have been determined.

The SFA predicts a deficit in production in the coal year ending March 31, 1945. Coal has an opportunity to support the war effort and earn additional praise from a grateful public by keeping that deficit down to little or nothing. Because of increased demand both to supply a war machine which shows no signs of reducing its requirements and to furnish adequate fuel for civilian use during the height of the consuming season, maximum production of both bituminous and anthracite becomes even more vital in the next three months.

Bituminous production for 1944 apparently was well

on its way to establishing a new record of 618,000,000 to 620,000,000 tons, although some 6,000,000 to 8,000,000 tons short of the goal of 626,000,000 set by government officials. The anthracite goal of 65,000,000 tons apparently was in the bag on the basis of previous and current production rates. These 1944 totals inevitably mean that the list of mines and collieries eligible for "Coal for Victory" awards will contain names numbered in the hundreds—another reason why COAL AGE is urging early checking of records and filing of official entries as early as possible in January, 1945, using the official entry blanks to be supplied by COAL AGE.

The deadline for returning official entries completely filled out is Jan. 31, 1945. However, companies that intend to enter mines or collieries will be helping themselves and will speed handling and judging of their entries if they arrange to get their data in as soon as possible. Waiting until the last minute might mean disappointment for some operation well deserving of one or both of the awards.

Long experience and intimate acquaintance with coal mining especially qualifies the men who will judge the awards. They are:

Dr. R. R. Sayers, director, U. S. Bureau of Mines, Washington, D. C.

Edward Steidle, dean, School of Mineral Industries, Pennsylvania State College.

R. Y. Williams, member, executive committee, Control Plan for the Anthracite Industry, Pottsville, Pa.

Carl Scholz, mining engineer, Charleston, W. Va.

Harold L. Walker, head, Department of Mining and Metallurgical Engineering, University of Illinois.

## How Your Mine Can Win the "Coal-for-Victory" Awards

1. Any mine or colliery in the United States that has a War Production Board serial number and was open for production in the calendar years 1943 and 1944 is eligible to compete for the "War Production Efficiency Award" or the "Victory Production Award" or both.

2. The "War Production Efficiency Award" will be presented to any serialized mine or colliery otherwise qualifying that increases its fresh-mined output per manshift 10 percent or more in the calendar year 1944 as compared with the calendar year 1943. This award is intended to recognize outstanding achievement in promoting efficiency by the methods normally employed and judging shall be not alone on the results but also on how they were achieved. Mines filing for the "War Production Efficiency Award," therefore, shall supply a statement outlining how the increase in output per manshift was obtained and shall agree to supply, upon request, such additional information as may be required to permit a decision to be reached.

3. The "Victory Coal Production Award" will be presented to any serialized mine or colliery otherwise qualifying if its fresh-mined coal production in the calendar year 1944 exceeds its fresh-mined coal production in the calendar year 1943 by 6½ percent or more.

4. More than one mine or colliery operated by any one company is eligible for and may receive either or both awards if they otherwise qualify. The winning of an award, or awards, by one mine or colliery operated by a specific company shall not prevent another mine or colliery operated by the same company from also winning one or both awards if it otherwise qualifies.

5. The awards to mines or collieries will consist of certificates attesting their contribution to the war effort by exceeding 1943 calendar-year production or output per manshift by the required percentages in 1944. Individual certificates also will be awarded each member of the winning mine's or colliery's supervisory staff attesting their contribution in helping the mine or colliery to win an award or awards. Should the operating company so decide, buttons for each employee at winning mines or collieries will be made available by COAL AGE at cost.

6. Qualifications for the awards shall be judged on the basis of statements submitted by authorized officials of the companies operating the mines or collieries in question on official forms to be supplied by COAL AGE. Statements must be completely filled out and must be filed on or before Jan. 31, 1945. Postmarks shall be the guide in judging acceptability under this restriction.

7. COAL AGE reserves the right to request from appropriate government or other statistical agencies certification of production and other figures submitted by coal companies filing for an award or awards, and such companies shall agree that statements are submitted subject to such certification.

8. A board of judges nominated by COAL AGE shall be the sole judges of the qualifications for awards and coal companies filing for the awards shall agree that their decision shall be final.

9. Realizing that changes arising out of the course of the war might materially alter conditions, COAL AGE reserves the right, if it should appear to be necessary, to modify the terms and conditions of the awards or adopt new terms and conditions, to the extent necessary to permit giving proper recognition for meritorious work in supporting the war effort.

10. Announcement of the awards will be made as soon as practicable after the final date for filing.

# TWO-VEIN STRIPPING

## Includes Second Cut in One at Glen Lyon

### Two Draglines in Tandem Handle Second-Cut Work in Top Ross With Supplementary Pillar Recovery Underground Increasing Tonnage — One Dragline Strips and Loads First Cut in the Bottom Ross Vein

By RALPH R. RICHART
Assistant Editor, *Coal Age*

ENLARGED MARKETS, improvements in equipment and better methods have revived stripping operations on the property of the Glen Lyon colliery, Susquehanna Collieries Co., Glen Lyon, Luzerne County, Pa. These circumstances have provided the solutions to the obstacles that halted strip operations in 1936. Today, outcrop stripping operations in two seams account for 18 percent of the output of the colliery. A second-cut operation in the Top Ross seam and a first-cut operation in the Bottom Ross seam, both of which were started in 1943, are being carried out in the same area by one contractor. Tandem operation with two draglines features the Top Ross work, with one unit stripping and loading the Bottom Ross. A more complete job of second mining underground in the Top Ross, on coal left after the second-cut operation, also is being done by this contractor. Approximately 500 tons of coal is stripped each day by the Biscontini & Sons Coal Co., contractors. Payment is made on the basis of coal delivered to the breaker.

The stripping operation described hereinafter is seventh or eighth on this property. In one area on the east side the Top and Bottom Ross seams lie vertically. Last year these seams, in places, were successfully recovered with draglines to a depth of 150 ft. and now deep, narrow gorges, being slowly filled by erosion of the rocky walls, stand in tribute to the courage and daring of the contractor who elected to make the attempt. Continuing south from this area the seams, in just a few hundred feet, change pitch to about 30 deg. and continue at this inclination around to the territory which is now being stripped.

Both the Top and Bottom Ross seams in this area were mined previously by underground operations, and prior to 1936 one stripping cut was taken in the Top Ross seam. The two seams outcrop high atop the mountain bordering the colliery property on the south along the Susquehanna River. The pitch of both seams is approximately 30 deg. north. About 400 ft. beyond the crop line of the Bottom Ross the surface of the mountain drops abruptly to the Susquehanna River and the broad valley below. Beyond the valley rise mountains, but mountains without the coal measures.

The Top Ross seam, the thicker of the two, measures 12 to 15 ft. and contains about 20 percent refuse. The overburden within the limits of the present cut, the record for this seam, consists largely of laminated sandstone topped by about 10 ft. of shale. Depth is 35 ft. on the shallow side (formerly





**Left: A narrow vertical gorge was left after the Bottom Ross vein was removed in this area in 1943. Right: Within a few hundred feet, the Bottom Ross changes from vertical to this pitched position of 30 deg.**

the back wall of the first cut made prior to 1936) and 80 ft. on the deep side along the new back wall. The slope of this 80-ft. back wall is maintained at 30 deg. with the vertical. Hard sandstone underlies the seam.

A 75-ft. layer of hard, very blocky sandstone separates the Bottom Ross from the Top Ross seam. The Bottom Ross, the lowest minable seam in this region, measures 6 to 8 ft. and contains very little refuse matter. In stripping this seam the back wall, because of its sandstone composition, can be kept practically vertical and seldom is more than 30 ft. high.

Since the pitch is 30 deg. and the interval between the two seams is 75 ft., the outcrop lines are some 200 ft. apart on the crest of the mountain. This enables the contractor to carry on the two strip operations abreast, or with either operation in advance of the other, without interference.

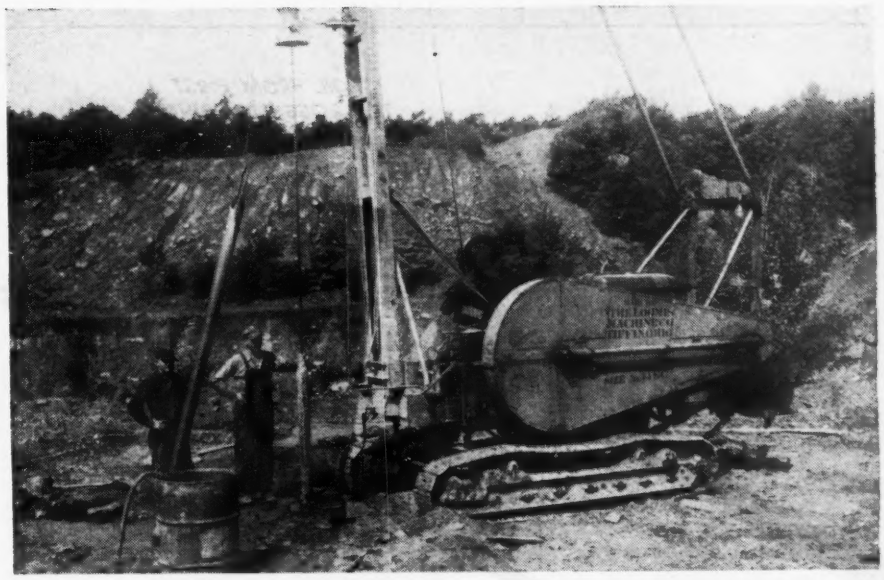
## Work in Tandem

All overburden is cast in stripping these two seams and the equipment comprises the following—Top Ross: Lima 1201 diesel dragline (2½-cu.yd. bucket); Marion 4101 electric dragline (2½-cu.yd. bucket); Loomis 44SC "Clipper" blast-hole drill; and five 7-ton dump trucks (White, Mack and International); Bottom Ross—Speed-Lima 1201 diesel dragline (2½-cu.yd. bucket); Ingersoll-Rand and Thor jackhammers; truck-mounted Model D-85 Ingersoll-Rand compressor; and three 7-ton International dump trucks.

Tandem operation with two draglines is the practice in stripping and loading the Top Ross. All drilling operations are coordinated with the shooting plan worked out by a duPont representative, who visits the operation once a week to load and shoot all holes. He describes the blasting practice in these words: "Six-inch vertical well-drill holes, 30 to 75 ft. deep, are drilled on a rectangular spacing, 15x15 ft. As the open edge of the pit is sloping, the first row is drilled as close to the edge as possible to reduce the burden on the bottom of the holes. In most instances this burden is less than 25 ft.

"Before well-drill holes were used it was necessary to drill and shoot the coal before it could be loaded. This drilling was eliminated by extending well-drill holes down to the coal and loading a short bottom deck, separated from the main charge by 8 to 10 ft. of stemming. Experience has shown that shock from this bottom load spreads into the coal, and makes secondary drilling of the coal unnecessary.

"Because of the wide variation in



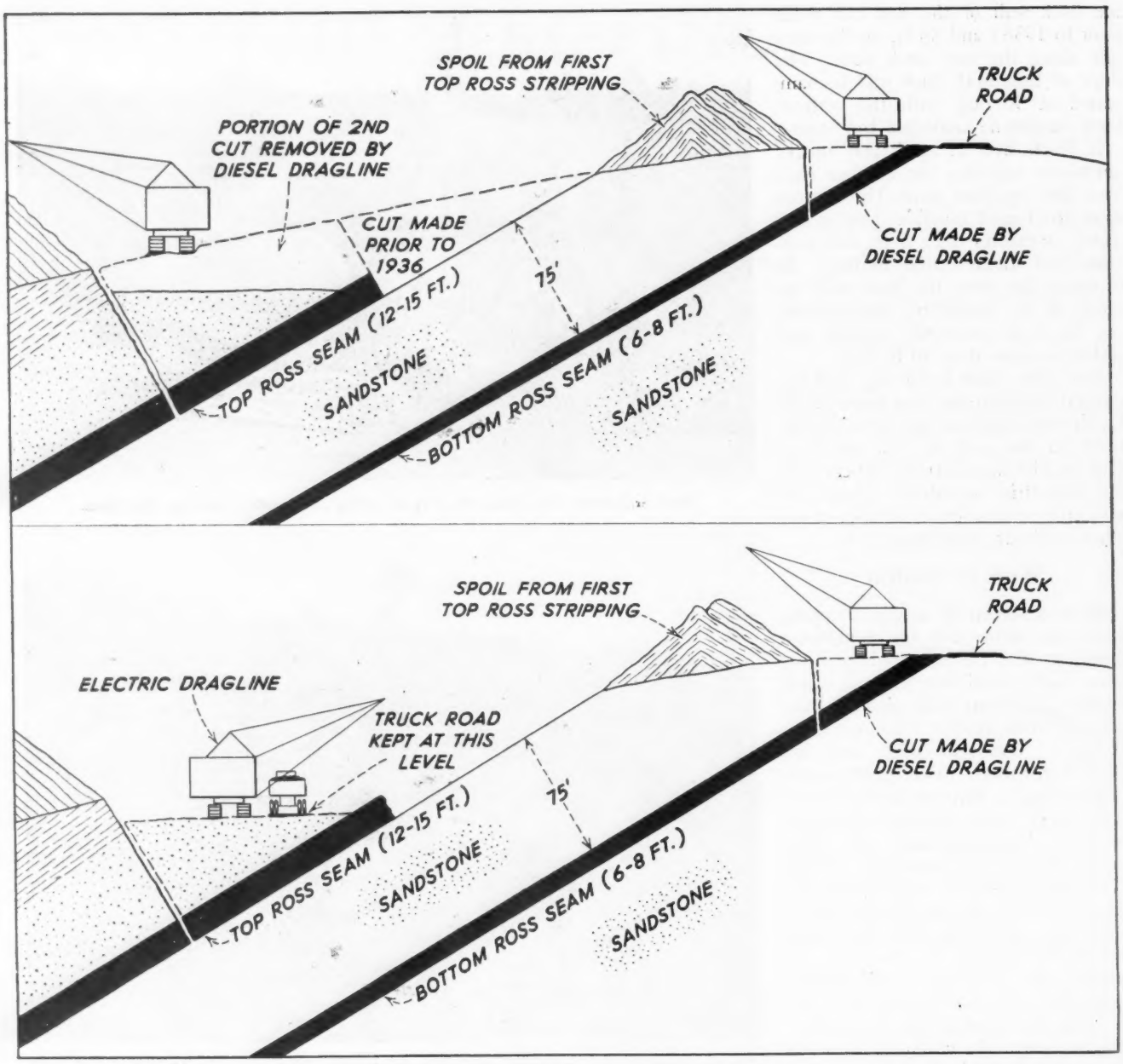
**Well drill sinks 6-in. holes 30 to 75 ft. in the overburden over the Top Ross.**



**Electric dragline loading truck with Top Ross coal. Men standing on the empty reel pick out refuse between bucket dumps.**



**Looking back from the electric dragline, the completed second cut in the Top Ross has this appearance.**




**Stages in Top Ross second-cut operation: above, diesel dragline removes top layer of overburden; below, electric dragline completes stripping and loads the Top Ross coal. One dragline handles all the first-cut work in the Bottom Ross.**

the nature of the rock, three different grades of explosives are used: duPont 40 percent Red Cross Extra, 5x18-in.; duPont 40 percent special gelatin, 5x24-in.; and duPont 60 percent special gelatin, 5x24-in. The charges are detonated by Primacord, which makes it possible to distribute the load in several decks where this is desired."

In the tandem stripping program for the Top Ross, the first step is removal of 10 ft. of shale and 20 ft. of sandstone by the 1201 diesel dragline (2½-cu.yd. bucket). This dragline operates two shifts a day. The remainder of the overburden down to the coal is removed and cast against the 1201 spoil on the bank, or downhill side, by the 4101 electric dragline, also with 2½-cu.yd. bucket. The electric unit removes overburden on two shifts and then loads coal on the day shift. The shock from the blasting of the overburden cracks the coal sufficiently to allow the dragline bucket to tear it out for loading into trucks.

A fleet of five end-dump trucks, consisting of a White, a Mack, and three Internationals, all gasoline-driven, haul the coal from the Top Ross to the Glen Lyon breaker. The trucks drive in on the bench left by the first dragline, turn and back up to the final machine for loading. Between bucket dumps, three men climb onto the truck and throw out what refuse material is exposed to view. As a result of this precautionary measure, much of the refuse is left at the strip pit. Each truck hauls approximately seven tons per trip and makes as many as twelve trips to the breaker in a shift. All trucks are required to weigh on the mine scale each trip. At the breaker the trucks dump onto a drag conveyor which elevates the coal to the top of the breaker.

A 5-mile one-way route generally used by the trucks includes an all-weather mine road, a highway, and a few city streets. The maximum grade on this route is 5 percent and most grades favor the loads. In the best weather another route dubbed the "Burma Road" is used. It is half as long as the first route, and has grades up to 20 percent, all favoring the loads.

Moving over to the stripping operations in the Bottom Ross, the overburden also is cast downhill, but





**Above: Dragline loading coal from the Bottom Ross. Right: Driller working ahead of the Bottom Ross dragline**

against an old spoil bank. This old spoil came from the first cut, made prior to 1936, in the Top Ross and in this case was cast uphill.

Before taking the first cut on the Bottom Ross all second-growth timber is cleared. Much of it is suitable for mine use and is cut and stored.

A drilling crew, using jackhammers supplied with air from a D-85 truck-mounted compressor, follows the timber-clearing crew and begins preparation of the overburden. Holes up to a depth of 16 ft. are drilled in the sandstone, exposed in large patches on the surface, and are loaded and shot by the duPont representative when he makes his weekly trip to the strip pits.

## Blasting Cracks Coal

After the overburden is blasted, a 2½-cu.yd. diesel dragline removes overburden on one shift and loads coal on the day shift. As in the stripping of the Top Ross, blasting of the overburden of the Bottom Ross cracks the coal enough to permit loading without further preparation.

A fleet of three 7-ton end-dump trucks, similar to those used for the Top Ross, haul the coal from the Bottom Ross to the breaker, over much of the route used by the trucks hauling from the Top Ross operation.

Since the old breasts (of the original underground operations) were never extended quite to the surface, the dragline stripping the Bottom Ross is working on blasted, yet rather solid, overburden. However, in the back side of the finished cut the old breast openings generally show. In the second-cut operation of the Top Ross the draglines are working on top of considerable overburden. If the rock should settle over the old breasts after the overburden is shot, the dragline fills in the slight depression and passes over the spot.

Two Model D-4 Caterpillar diesel bulldozers are available for odd jobs around either strip pit. One bulldozer and a road grader are used part time to work the strip-mine roads, built from spoil-bank material.

Besides the stripping operations,

the contractor is doing some underground work. As the original underground operations were started some 55 years ago, it was to be expected that the technique of second or pillar mining of the early days could not be compared with that now used. This conclusion is borne out by the condition of the old breasts which the strip cuts are exposing daily to the light. In some places a 6-ft. bench was left in the breasts driven in the thick Top Ross seam. Because of this lack of complete recovery the contractor decided to do some underground mining in connection with the stripping work.

## Little Drainage Problem

After completing the second cut of the Top Ross, a slope is driven down an old pillar to a point just short of the last old gangway. Here laterals are driven parallel to the old gangway for a distance of 1,000 ft. By limiting the length of the new laterals (gangways) to 1,000 ft. a relatively quick withdrawal from a given territory can be had and the question of timbering need not receive quite so much attention. The laterals are driven on a slight angle so the grade will be downhill for the empties. In that way a small electric hoist on the surface is able to handle all the haulage needs. From the laterals new breasts are driven up the pitch in the remaining pillars and the full height of the seam is recovered. On the surface the coal is dumped into a chute and trucked to the breaker by the trucks which also serve the strip operations.

Because of the favorable position of the strip cuts on the mountain, little trouble is experienced from rainfall. What water reaches the cut flows into the old workings and eventually by gravity to water-level tunnels and out to the surface, farther down the mountain.

Power for the electric dragline comes from the Glen Lyon colliery's substation at 2,300 volts, 3-phase, 60 cycles. All pole-line service is taken care of by the electrical force at the colliery.

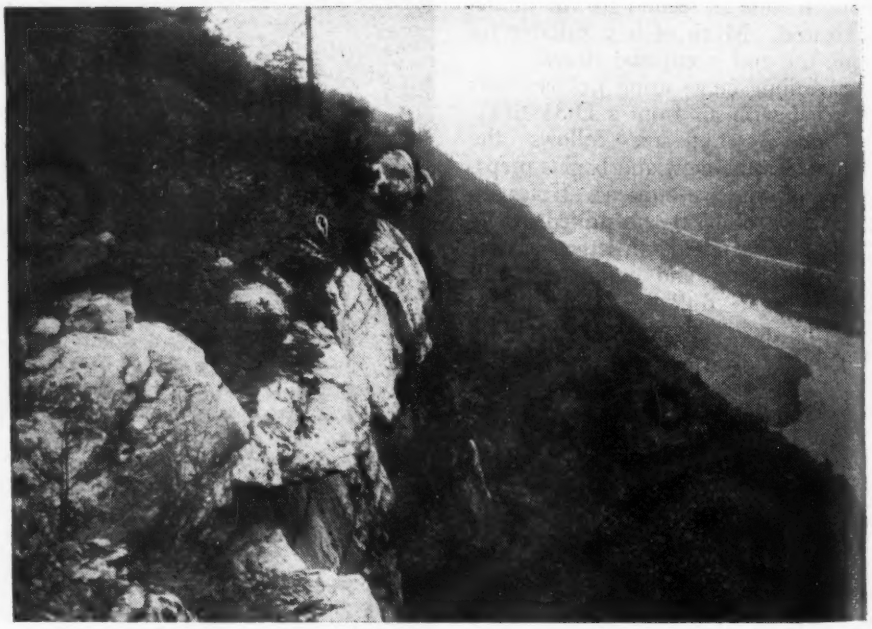
Officials of the Susquehanna Collieries Co. located at the operating office, Nanticoke, Pa., are C. A. Gibbons, vice president and general manager, and C. H. Matthews, mechanical and electrical engineer. At the Glen Lyon colliery are W. E. Weineck, superintendent; A. H. Harvey, mining engineer; Russell Worrall, assistant mining engineer; and Adolph Sutter, mine electrician. The stripping contractor is Biscontini & Sons Coal Co., Nanticoke, Pa.



**Portable compressor supplies air for Bottom Ross drilling.**



**Strip cut exposes the extent of caving over an old breast.**



**Some 400 ft. beyond the Bottom Ross crop line, the surface drops abruptly to the Susquehanna River Valley.**

# SAFE MINE POWER

## Keynote of Knox Consolidated Program

### Good Materials, Good Construction and Understanding Promote Electrical Efficiency and Safety—Non-Inflammable Transformers Adopted Underground — Safety Locks Protect Men at Work

By FRED W. RICHART
Assistant Editor, Coal Age

ELECTRIC POWER, the strong right arm of coal mining, may be stripped of most of its potential hazards by sound engineering, purchasing correct equipment, using good protective devices and training men to observe safety rules. The a.c. and d.c. distribution systems in the three mines of Knox Consolidated Coal Corp., Bicknell, Ind., conform to this policy in both design and operation.

The generation of power at Mine No. 1 and the distribution of power in all the mines, as well as all problems in electrical design and installation, are under the supervision of H. Banholzer, electrical engineer for all the properties. Under him is a chief electrician for each mine who has charge of actual operation and maintenance. Second- and third-shift foremen report to the chief electricians.

Mine No. 1 has a 2,300-volt condensing steam-turbine generating plant. There are two machines, 1,600 kw. and 500 kw., the latter being a standby unit. The plant produces half the power required by this mine. The remainder for Mine No. 1 and all the power for Mines Nos. 2 and 5 is purchased from the public utility.

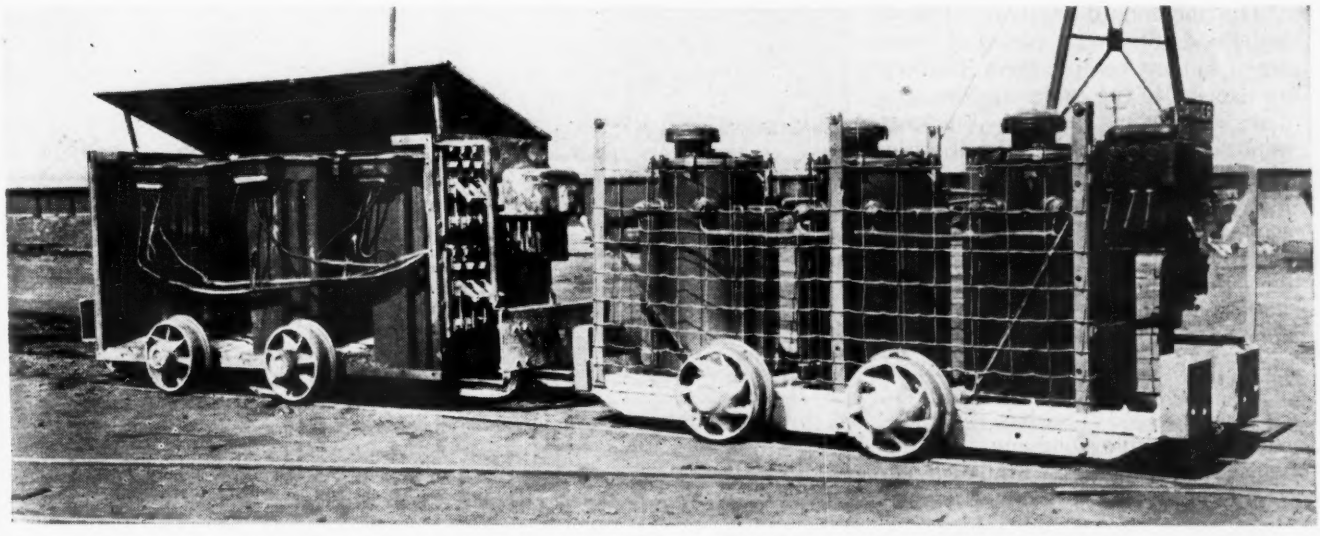
Drilling, cutting and loading machines in all mines are driven by a.c. motors, with power from small 2,300/230-volt portable transformer substations located near the point of operation. These substations are kept within 1,000 ft. of the working face to keep down secondary line losses and prevent stalling of machines.

Shuttle cars are operated by battery power. Batteries are charged by a 35-kw. 2,300-volt a.c. 125-volt d.c. motor-generator controlled by charging panels built in the mine electric shop. One charging set is used for each two shuttle cars and is located very close to the transfer station, as one battery change must be made during the working shift.

The d.c. power for locomotive haulage is provided by motor generators (2,300 volts a.c. to 250/275 volts d.c.). These motor generators are so distributed along the haulageways as to insure a minimum of 220 volts at the farthest point. All substations, a.c. and d.c., are underground.

The 2,300-volt power lines on the surface, whether from the generating plant or transmission-line substations, run to drillholes scattered over the working area. The poles are 35 ft.; copper conductors, 4/0; and the lightning protection, pellet and capacitor type Thyrite arresters. At drillholes the overhead lines are connected to 4/0 three-conductor leaded and wire-armored cables which are suspended in the drillholes to reach the entries below. This connection is at a gooseneck weatherdrip, at which point the cable conductors are fanned out (Fig. 1) to disconnect switches.

Where borehole cables are brought into the entries General Electric FK-20 300-amp. oil-circuit breakers are inserted in the line. These are called the master breakers. From the load



**Comparing the portable 112.5-kva. underground substations. Oil is used in the station at the left, with non-inflammable filling in the station at the right. The control is the same for both. Removed side shows internal view of the oil-filled type. Floors are dropped to reduce height. The non-inflammable transformers are bolted to the floor plate to make grounding more effective. Non-inflammable transformers are now standard. To move, it is necessary only to kill and disconnect the 2,300-volt cable and disconnect secondaries.**

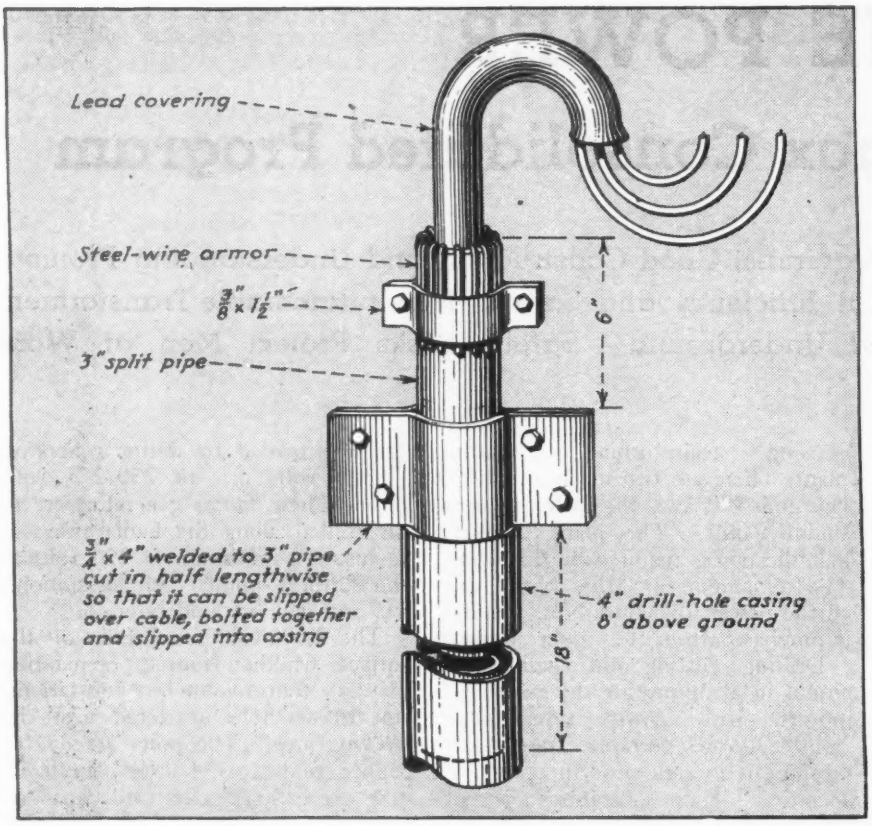



**Fig. 1—Wire-armored cable support and gooseneck weatherdrip are included where cables are connected to pole-line wires. Some of these cable clamps have been in service more than 15 years without trouble. The strain is on the armor.**

side of a master breaker wire-armored cables extend to as many working sections as may conveniently be served from that borehole. Each of these cables is protected by a 200-amp. breaker similar to the master breaker. These section breakers are located very near the master unit and are fitted with 60-amp. tripping coils to open the breaker on shorts and overloads.

The method of cable installation, and the results over a period of years, are of interest because there has been no damage to the cables and no accidents to men, with the following minor exception. Some strands of the grounded armor were burned in two by the accidental contact of damp slate across the feeder cable (275 volts d.c.) and the cable armor. Fig. 2 indicates how this happened. Suspension of a.c. cables and d.c. feeders on the same support has been abandoned and so this trouble is no longer possible.

The present method of installing a.c. cables and d.c. feeders is to support the a.c. cable along one rib of the haulage entry and the insulated d.c. feeders along the opposite rib. All underground cables and feeders are suspended from the roof.

Cable supports are made up of clevis-type steel hangers carrying horizontal spool-shaped porcelain insulators on through bolts, supported from the roof by Ohio Brass expansion bolts. These insulating units are attached to the roof at 10-ft. intervals for 4/0 cables and at 15-ft. intervals for No. 6 cables. No messenger wire is used as in some other mine installations, the steel armor serving that purpose.

There is a mechanical reason for suspending the armored cables on porcelain spools, free to rotate, although grounded at all connecting terminals. It is well known that surges of current due to switching, grounds or shorts set up mechanical stresses and may move the conductors several inches—even feet. By giving these cables a chance to move freely, there is little danger that surges will damage them. The armor on these cables is No. 9 steel wire. Where the conductors are connected to an oil circuit breaker, entering or leaving, two of these armor wires are unwrapped and grounded on the case of the breaker. This makes a continuous ground circuit of the armor from top of borehole to the last a.c. or d.c. substation. In case a failure of insulation puts current on the armor, it usually burns these two steel wires in two, indicating where the trouble may be found.

Two types of transformers are used. All are 37.5 kva., making the capacity of each substation 112.5 kva. Transformers in the earlier stations are all oil-filled, with each station protected by a General Electric FK-20 oil circuit breaker equipped with 40-amp. tripping coils on the high-voltage side. These transformers are mounted on standard mine-car trucks to make them portable and are completely inclosed by a steel housing. The top cover is hinged so that it may be raised for ventilation. This cover is held open by a rope and fuse wire while in normal operation. In the event of a fire the fuse will melt and the door close by gravity.

The inclosure is filled with sand around the transformers to a depth of 18 in. to absorb any oil that might leak from the transformer cases. Two

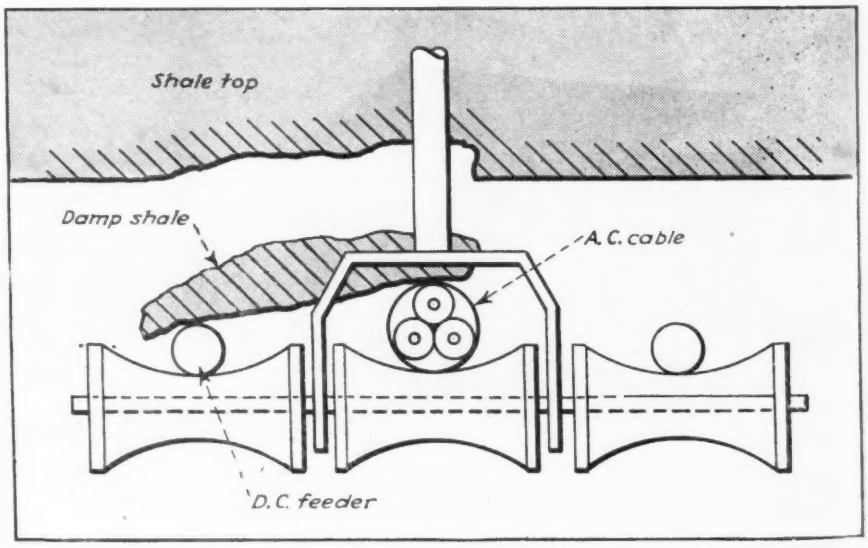



**Fig. 2—How a piece of shale in a damp atmosphere fell across d.c. feeder and a.c. cable armor, burning in two some of the armor wires, the armor being grounded at various points. This construction was abandoned.**

three-pole knife switches in the secondary circuit, mounted on one end of the inclosure, provide for attaching the portable cables leading to cutting and loading machines. There are 15 substations of this older type. The voltage is 2,300 to 230.

The newer substations are made up with Pyranol-filled transformers of the same capacity and voltage as the oil type. Since Pyranol will not burn or support combustion, the transformers are bolted down on an open steel platform on car trucks, surrounded by substantial woven-wire fencing, which is grounded to the steel floor. The car is grounded to the rail through the wheels. Since all exposed metal parts are grounded, the possibility of shock by contact is obviated. The protective and switching equipment is the same as on the oil-filled type.

The original use of fused knife switches in the secondary circuits of transformer substations had to be abandoned because blown fuses were often replaced with heavy copper wire, making them useless as protective devices. The FK-20 breakers are now relied on for protection.

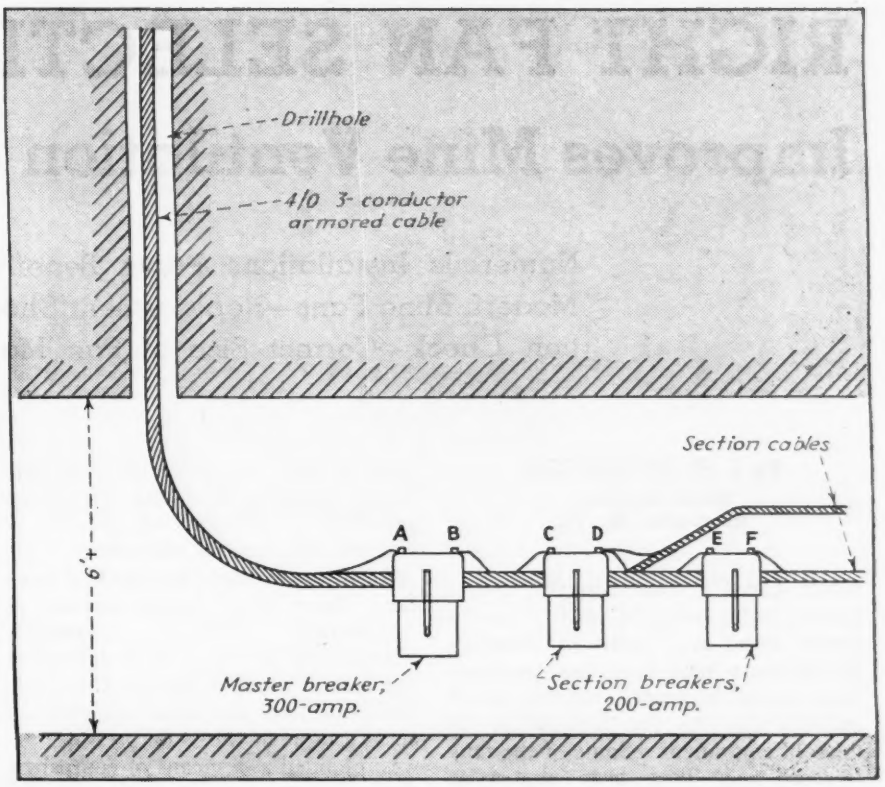
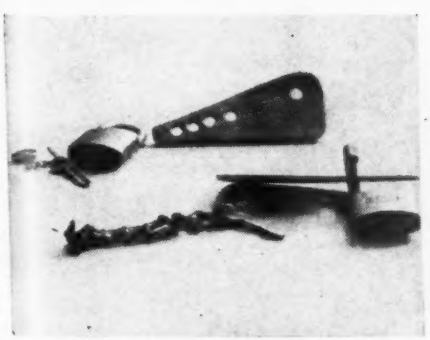



**Fig. 3—A, B, C, D, E and F are points where armor wires are grounded on breaker tanks. Armor wires also are grounded to circuit breakers where section cables feed into the substations.**



**Oil circuit breaker with safety wedge and locks in place.**



**Individual safety wedges and locks of the types used at Knox Consolidated mines to lock breakers open when work is being done on the system.**

To eliminate soldered joints in the secondary circuits, all knife-switch lugs have been replaced with Burney lugs. This permits making a firm connection quickly with a wrench.

There are four motor-generator substations (2,300 volts a.c. to 275 volts d.c.) for supplying power to the haulage system at No. 1 mine. The locomotive equipment comprises 7-ton cable-reel units for gathering and 13-tonners for main-line haulage. The trolley wire is 4/0, which is supplemented with 500,000- and 1,000,000-cir.mil insulated feeders. Ohio Brass overhead line material is employed. One motor generator (300 kw.) has complete automatic control. This has been in continuous service more than 2½ years with no expense other than periodic inspection.

Power-factor is corrected by overexciting the motor-generator sets. The result varies somewhat from month to month but usually is better than 0.98. At No. 2 mine a small capacitor is used during load hours and is disconnected during idle times.

Since all inside-of-mine circuit breakers are the same type, a unique personalized switch lock that applies all over the system has been devised to prevent switch closing when electricians are working on the lines.

Each workman has his own locking wedge, lock and key. The wedge has his name stamped on the side. It has several holes along one edge by which it may be locked behind the switch handle by as many locks. That limits the movement of the handle and prevents the switch from being closed. So, when three men go out on a line to shoot trouble, or to move a substation, the circuit breaker is locked open by each man. Each is responsible for his own protection and removes his lock only when his work is completed.

Two master keys are available for emergencies. One is in possession of the electrical engineer and the other is held by the chief electrician. These are never used unless it is positively established that the line or the station is clear of men. In the event a key is lost or falls into the hands of some unauthorized person, the combination of any lock may be removed and a different combination substituted. The change takes but a moment.

The type of a.c. cable used underground, the method of supporting conductors from the roof, the elimination of fuses and the rule that makes each man responsible for his own safety are outstanding features of the Knox Consolidated electrical system. To date there has been no a.c. cable failure, nor a single serious personal injury on the system.

# RIGHT FAN SELECTION

## Improves Mine Ventilation and Cuts Cost

### Numerous Installations Prove Benefits of Properly Selected and Modern Mine Fans—Replacement Should Be Preceded by a Ventilation Check—Correct Size of Fan Materially Reduces Power Cost

By J. H. DICKERSON
Mining Engineer
Huntington, W. Va.

ONE LARGE coal company is reported to be saving $75,000 a year in power alone as a result of changing all its mine fans to a modern type. This saving, however, probably is not entirely due to the installation of modern equipment. Some of the fans replaced may have been almost as efficient for the purpose for which they were designed, but the mine conditions changed. Others may have been purchased on a price basis without considering the extra power cost for the particular fan. And some probably were in bad condition or may have been moved to new locations for which their characteristics were not suited.

Numerous other new fan installations are additional evidence that substantial cost reductions and improved ventilation warrant the utmost care in selecting a fan either for replacement or for a new mine. If it is for a replacement, the first step, before figuring on the fan, is a check of the ventilating plan (September *Coal Age*, p. 100). A change in the system of ventilation, cleaning up airways, reducing leakage, providing more or shorter airways, putting in a new airshaft or drift opening as an outlet or inlet, using more than one fan, changing the fan location and the like may result in a better return than a more efficient fan. But the majority of the fans, as used, are less than 50 percent efficient and should be replaced as a matter of economy unless the mine is nearing exhaustion.

New fan selections, however, should be based on a comprehensive plan of ventilation, taking into consideration future requirements as far as they can be determined. Then it is necessary to get accurate readings of the air volume and pressure at the point where the fan is to be replaced or determine what would be required at a new airshaft or other location and make adequate allowance for future increases in volume and pressure if the new fan is to be satisfactory.

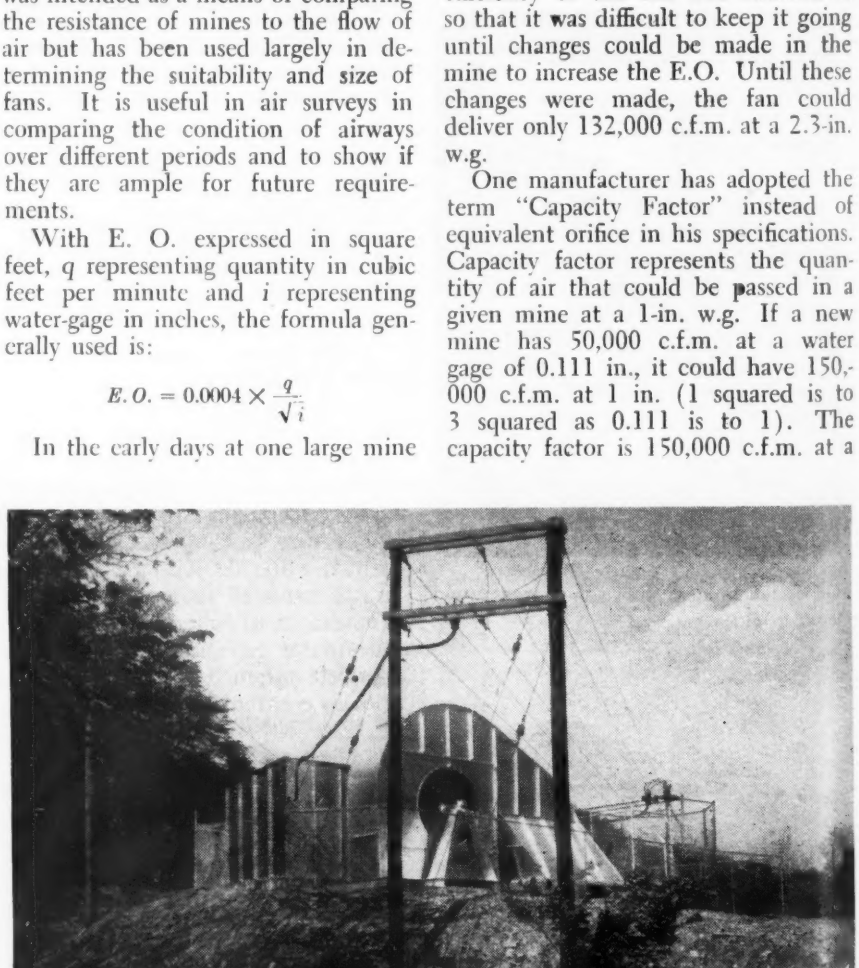
In most contracts for efficient mine fans there is a factor known as "Equivalent Orifice," commonly abbreviated "E. O." It is defined as the area of an opening in a thin plate that will pass the same quantity of air as a mine at the same pressure. It was intended as a means of comparing the resistance of mines to the flow of air but has been used largely in determining the suitability and size of fans. It is useful in air surveys in comparing the condition of airways over different periods and to show if they are ample for future requirements.

With E. O. expressed in square feet, $q$ representing quantity in cubic feet per minute and $i$ representing water-gage in inches, the formula generally used is:

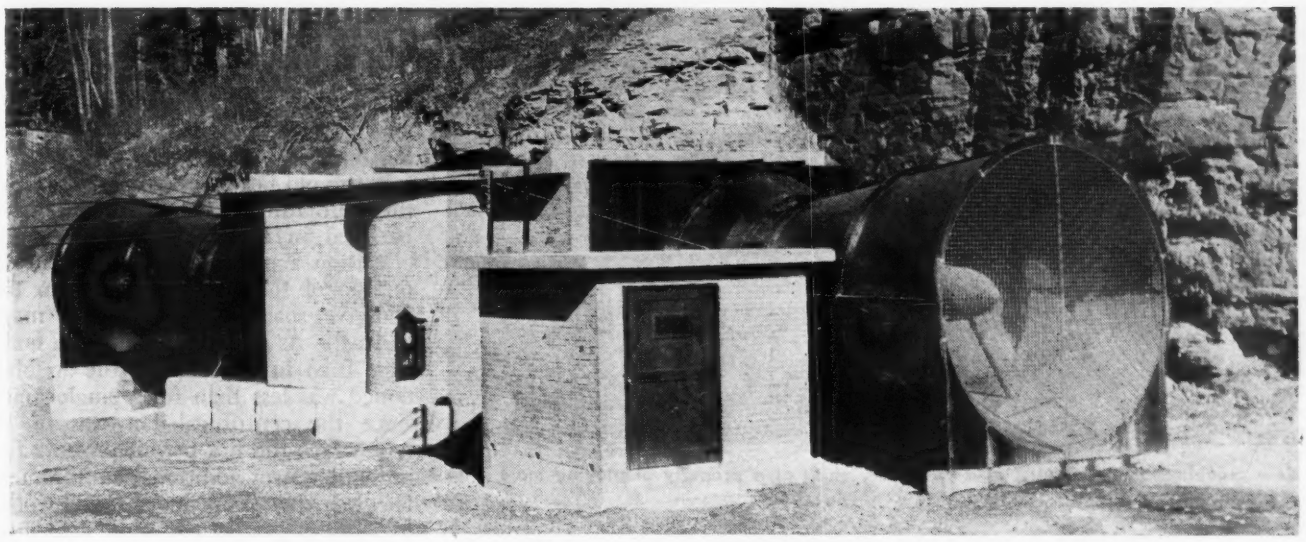
$$E.O. = 0.0004 \times \frac{q}{\sqrt{i}}$$

In the early days at one large mine the fan was designed for 300,000 c.f.m. at a 4-in. w.g. with an E.O. of 60 sq.ft. The fan, a Capell unit, would have been satisfactory for this duty, but in crowding the mine for tonnage a squeeze resulted which reduced the E.O. to 35 sq.ft. This resulted in a damming-back effect, with the air trying to back out of the fan which was trying to force it into the mine. This not only impaired the efficiency of the fan but strained it so that it was difficult to keep it going until changes could be made in the mine to increase the E.O. Until these changes were made, the fan could deliver only 132,000 c.f.m. at a 2.3-in. w.g.

One manufacturer has adopted the term "Capacity Factor" instead of equivalent orifice in his specifications. Capacity factor represents the quantity of air that could be passed in a given mine at a 1-in. w.g. If a new mine has 50,000 c.f.m. at a water gage of 0.111 in., it could have 150,000 c.f.m. at 1 in. (1 squared is to 3 squared as 0.111 is to 1). The capacity factor is 150,000 c.f.m. at a



**Changing mine conditions resulted in this installation of a modern fan unit at a new airshaft 15,000 ft. from the mine portal. It followed construction of another opening and installation of a new fan at an opening 5,000 ft. from the portal.**



**Two propeller fans operating in parallel at a new outlying airshaft at a southern mine. In addition to power savings the two fans provide greater insurance against complete interruption of service.**

1-in. w.g., corresponding to an equivalent orifice of 60 sq.ft.

If the mine is to use this much air later the resistance probably will have increased to make the pressure 2 in. w.g. or more. This additional pressure is due to the resistance of the advanced workings. If the pressure is 2-in. w.g. for 150,000 c.f.m., the volume of air which the fan will pass at 1-in. w.g. is reduced to approximately 106,000 c.f.m. (150,000 divided by the square root of 2), which is the capacity factor. The equivalent orifice for 150,000 c.f.m. at a 2-in. w.g. is 42.4 sq.ft., which would pass 106,000 c.f.m. (42.4 divided by 0.0004) at a 1-in. w.g.

An increase in resistance will decrease the equivalent orifice or capacity factor, while splits, larger airways, a new intake, etc., will tend to increase them. Where mine projection and ventilation are planned, the size of the E.O. may be set for different stages of development. It should be kept as large as possible and should not fall below the size set. If it is lower, the cause should be determined and corrective measures taken at once.

If leakage is excessive and is to be corrected, the approximate E.O. may be calculated for the airways without leakage. The E.O. for 100,000 c.f.m. at a 2-in. w.g. would be 28.2 sq.ft., but if only 60 percent of the air reached the last crosscut and the leakage could be eliminated so that the full 100,000 c.f.m. reached the working sections, the pressure would be increased to about 3.125-in. w.g. (80 squared is to 100 squared as 2 in. is to 3.125 in.—see May, 1941, Coal Age, p. 45). The equivalent orifice would be reduced for the full quantity of air without leakage to about 22.6 sq.ft., a reduction of 20 percent. If it is desired to determine this E.O. closely, it will be necessary to get quantity and pressure readings on representative parts of the mine and then make calculations.

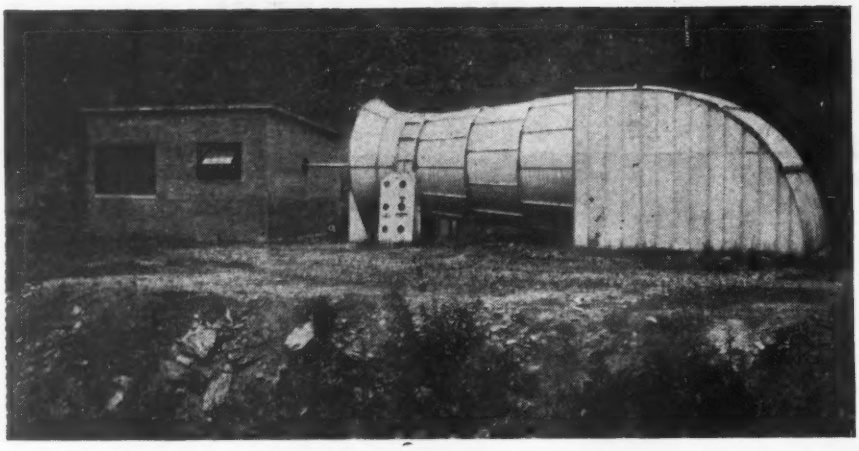
The result arrived at in the preceding paragraph might seem to be a disadvantage as far as the E.O. is concerned, but it always pays to reduce leakage in the main airways between the fan and the working sections. The E.O. would be about 22.6 sq.ft. also for 60,000 c.f.m. without leakage, but the pressure would be about 1.125-in. w.g. (80 squared is to 60 squared as 2 in. is to 1.125 in.). The 60,000 c.f.m. could be delivered with about 34 percent of the power required for 100,000 c.f.m. at the fan and only 60,000 c.f.m in the working sections after leakage losses in the main airway. The lower figure for the E.O. really represents the resistance of the workings to the full quantity of air, while the higher figure is the result of part of the air being short-circuited and, therefore, not being subjected to the full resistance of the circuit.

### Better Fans Save Money

As most fans run continuously and ventilation is one of the principal items in large power bills, this factor should be considered in the purchase of a new fan. In a mine producing 2,000 tons a day, the fans may handle an even larger tonnage of air in the same time. The first cost of an efficient fan may seem high, but if the excess power cost for a year is added to the cost of the cheaper fan the total may exceed the figure for the higher-priced more efficient unit. A No. 8, 10 or 12 fan in a manufacturer's list, corresponding to diameters of 4, 5 and 6 ft., may be used for 50,000 c.f.m. at a 2-in. w.g. The No. 10 is the most efficient for this load, and if it is to run most of the time it will be the cheapest over a period of years. Yet the salesman may concentrate on the No. 8 if price seems to be the first consideration with the customer. For 100,000 c.f.m. at a 2-in. w.g., a No. 10 may be used but will require about 57 hp., while the No. 12 will do the same job with 45 hp., reducing the power bill over 20 percent.

It would be well for a fan purchaser to insist on an analysis of installation and operating costs for several sizes of fans, such as that outlined at the February, 1941, meeting of the American Institute of Mining and Metallurgical Engineers, by Dr. Theodore H. Troller, director, Guggenheim Airship Institute. Dr. Troller listed three fan diameters (Nos. 1, 2 and 3) priced at $7,000, $5,500 and $4,500, respectively, as satisfactory for a certain duty. To these he added the cost of an adapter, airshaft hood and fan drive, making the total equipment cost $9,686, $8,046 and $6,966, respectively. Installation of this equipment, including motor house, wiring, transportation, etc. brought the total costs to $11,334, $9,491 and $8,241, respectively.

Power cost for 235,000 c.f.m. at a 4.15-in. w.g. (1.5c. per kilowatt-hour) for a year of continuous operation, plus maintenance and depreciation, make the operating cost for a year $21,173, $21,557 and $22,659, respectively. Over a ten-year period, the



**New propeller-fan installation at an auxiliary shaft at a property employing more than one ventilating unit.**

total operating cost for the No. 3 fan is $14,860 more than for the No. 1, or more than twice the cost of the No. 1 fan. It might be noted that depreciation is for a 15-year period but does not include depreciation on the fan drive or all accessories and installation; also that the cost of maintenance is not adequate. That, however, does not materially affect the value of the analysis.

Some manufacturers make high-, medium- and low-pressure propeller fans. For example, a 5-ft. low-pressure fan will be good for about 40,000 c.f.m. up to 1½-in. w.g. with an efficiency of about 45 percent. For the same diameter, the medium-pressure type is good for about 60,000 c.f.m. between 1½- and 2½-in. w.g. with an efficiency of about 65 percent. The high-pressure type is good for 80,000 c.f.m. at a 3-in. w.g. with an efficiency of around 80 percent.

The increased efficiency in these fans of the same diameter is due to the more expensive construction. If the low-pressure fan is operated to deliver 40,000 c.f.m. at a 1½-in. w.g. 24 hours per day for a year, with power at 1½c. per kilowatt-hour, the difference in power cost between it and the medium-pressure unit would amount to approximately the difference in the price of the two fans. In this case, the low-pressure fan would not be economical, but for a lower pressure or a fan used only part time it might be advisable.

High-speed propeller fans use antifriction bearings and may run continuously for months without the addition of grease or other attention, although such a practice hardly is to be recommended. A certain rope-and-button retarding conveyor ran for eight years without repairs and, therefore, never got any attention. But it finally broke and repairing the damage was very expensive, aside from the loss of tonnage due to the failure.

Equipment that does not require much attention for long periods is likely to be overlooked when it begins to fail. This happened to an expensive propeller fan. It probably went beyond the time recommended for greasing or an inferior grease may have been used. The result was failure of the bearings with damage to the shaft and rotor and a mine shutdown.

## Standby Considerations

In the past, the importance of continuous fan operation at certain mines has led to the installation of standby equipment. At one mine two separate fans were installed at the same airshaft. The load usually was carried by the fan driven by a corliss engine, which was near a large power house. An electrically driven fan with a reasonably safe source of power was installed at an auxiliary airshaft. Any one of these fans could have supplied the mine in an emergency. Electric power and transmission in most coal fields have become so reliable that there seldom is a stoppage from this source. However, some mines have standby motors or gasoline engines to drive the fan temporarily or furnish power for the fan motor.

To avoid trouble with expensive high-speed propeller fans, it is suggested that they be provided with an indicator to show any undue heating of the bearings. These indicators are made for other high-speed equipment and the cost is a small factor. Observation of the indicator once a day will eliminate all danger of the bearings going too long without greasing or being supplied with an unsatisfactory grease. When a fan fails, a company's entire investment in a mine may be lost, so sufficient attention should be accorded the fan to keep it in good shape.

If a fan has become inefficient but still is serviceable and is replaced by another at the same or a different location, it may be advisable to retain the old fan and connections with the ventilating system so that it may be used in an emergency. At one operation a propeller fan is mounted on top of the old centrifugal fan to conserve space, and either fan may be used. As an experiment, both fans were tried in parallel, but the air obtained was less than for a single unit since the centrifugal fan was of a type which did not permit pressure to be built up for additional air volume. However, two propeller fans will work together in parallel and some centrifugal fans will operate satisfactorily in parallel with propeller equipment.

Where a large volume of air is required at one opening it may be advisable to consider two fans in parallel. They provide a greater insurance against complete interruption of ventilation growing out of a mechanical or electrical difficulty. One fan will continue to circulate nearly 80 percent as much air as the two in parallel but at a much lower pressure. The reduced quantity generally will be ample for idle days or in an emergency. In a test of the two fans shown operating in parallel in an accompanying illustration, one working alone produced 72,000 c.f.m. and the other 74,500 c.f.m., while the two in parallel produced 91,000 c.f.m.

A formula for the volume of air produced by two fans of the propeller type running in parallel is:

$$\sqrt[3]{q_1^3 + q_2^3}$$

The result provided by this formula is about as close to the actual test result in the preceding case as air usually is measured. One of the readings may have been affected by an open door somewhere in the mine or by some other factor. This formula is satisfactory for two propeller fans of different sizes, speeds or adjustment of vanes when running in parallel. The cost of two fans is somewhat higher than a single fan that would provide the same volume at the same pressure. In some cases, where mining conditions have changed, a propeller fan has been added to run in parallel with an existing fan, either at the same opening or at a supplementary shaft or opening. At certain operations, on the other hand, the problem of changes in the ventilating conditions has been handled by dividing the property into two or more sections, each ventilated by its own fan installed at a logical spot.

# CONTROLLED CONE

## More Efficient and Needs Less Attention

### Load-Responsive Equipment Times Cone Refuse Discharge and Increases Cleaning Efficiency—Control for One Cone Completely Automatic—With Other, Discharge Cycle Is Started Manually

THE UNTIMELY dumping of refuse from Chance cones has been eliminated by the installation of load-responsive control equipment at the Hazleton Shaft colliery, Lehigh Valley Coal Co., Hazleton, Pa. This control governs the instant of starting for the cycle of operation and also keeps the time for that cycle uniformly regulated. As a result of this installation, the output of the cones is more uniform and the attendant is relieved of a very tiresome routine.

The signal for starting this refuse-discharge cycle is based on an overcurrent indication from the agitator motor. In the case of the cone which handles the buckwheat and rice sizes, the sequence of operations begins when the line current of the motor reaches 18 amp. This sequence is as follows:

1. Top gate opens for 45 seconds.
2. Top gate closes and bottom gate opens for 10 seconds.
3. Bottom gate closes and 6 or 7 seconds is allowed for the lower chamber to fill with water.

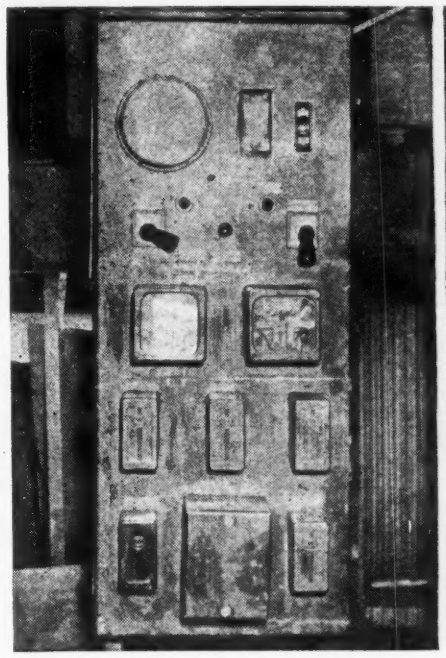
This cycle repeats itself when the motor current again reaches 18 amp., indicating that the refuse should again be discharged.

Indicating lamps show the position of the various gates at all times. A lamp burns when the gate is in the open position. The control can be set for either automatic or supervisory operation. When the control handle is turned to the supervisory side, the operator can control the gates at will.

The control for the cone handling pea, nut, stove, egg and broken lump is not fully automatic. Provided with only the sequence feature, the cycle must be started each time by the cone operator. He watches the ammeter and when the pointer reaches 30 amp. sets the sequence timing in motion.

The operating sequence for this cone is the same as for the small-coal cone except that the top gate is held open for only 30 seconds.

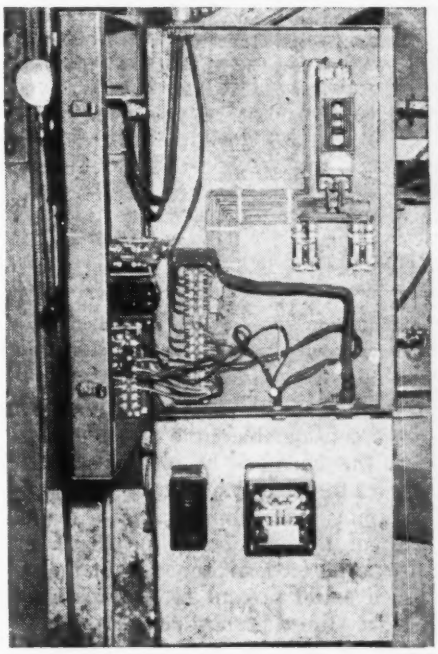
Both phases of refuse discharge from the fully automatically controlled



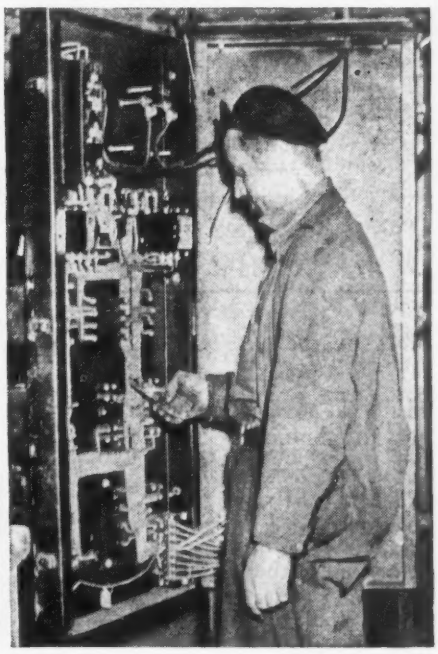
Control panel for the small-coal cone with metal cover removed to show the relays.



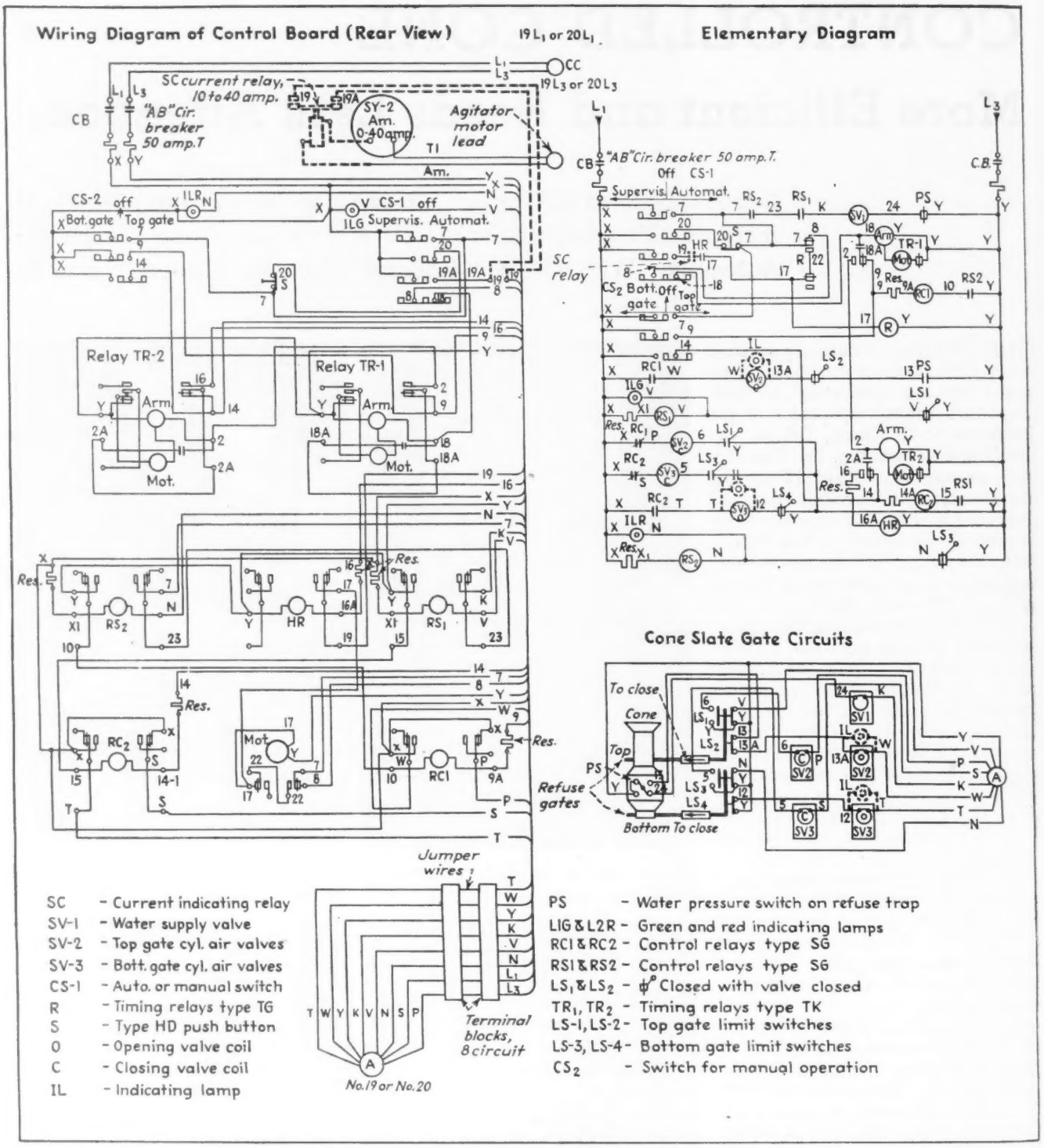
Rocco Evangelist preparing to start coarse-coal cone sequence on 30-amp. reading.



Interior view of the control board installed for the regulation of the coarse-coal cone.



George Shema, electrician, looks over the wiring of the small-coal cone-control panel.




**The original wiring diagram was revised as indicated by dotted lines to include the devices necessary to make refuse discharge fully automatic.**

small-coal cone are accomplished without the immediate attention of an operator. By discharging the cone when the current of the agitator motor reaches 18 amp. the refuse bed never gets above a given level and better regulation of the specific gravity of the sand-water mixture is maintained. This leads to a cleaner and more uniform product.

The second phase, that of ejecting the refuse from the bottom chamber, being operated on split-second timing, saves considerable time and serves to put the chamber in readiness much sooner to receive another charge. This dumping time is important, for in the case of the cone handling the large sizes the feed at times contains as much as 60 percent foreign material. Under those conditions everything must be working well to dispose of these slugs of waste material.

Much of the credit for the idea involved in this automatic control is due the engineering department of the Lehigh Valley Coal Co. The control equipment is Westinghouse.

Officials in charge of the colliery are K. F. Arbogast, general manager; Edgar Schweitzer, mechanical engineer; E. B. Wagner, electrical engineer, all of Wilkes-Barre, Pa.; T. C. Price, superintendent; George Brisiel, division electrician, and T. Eichler, mechanical engineer, all of Hazleton.

# Exides Keep It Pulling Steadily and Strong



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Exides are designed and built to provide the high voltage needed to meet the most severe motive power needs encountered in any mine. Most operators know this. That's why more of them use Exides. They have learned that when their locomotive and shuttlecar batteries are Exides, they can count on dependability, long-life and ease of maintenance.

If you wish more detailed information, or have a special battery maintenance problem, write to us. We want you to profit from the long-life built into every Exide Battery. Write for booklet Form 1982.

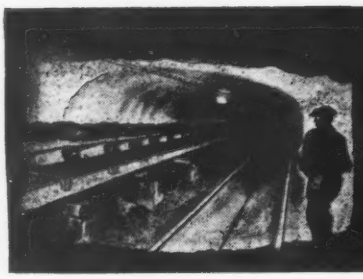
•

**SUPPORT THE 6TH WAR LOAN**
**LEND OVER HERE, TILL**
**IT'S OVER, OVER THERE**

ARMY E NAVY

**Exide**
**BATTERIES**

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32
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# THE FOREMEN'S FORUM

# Posting Weak Top in Shuttle-Car Mine

***Some Posts Set Fan-Wise, Sometimes With Two Legs on Outside of Curve, Hold Loose Top Rock in Place—Small Fenders Are Left Between Lifts***

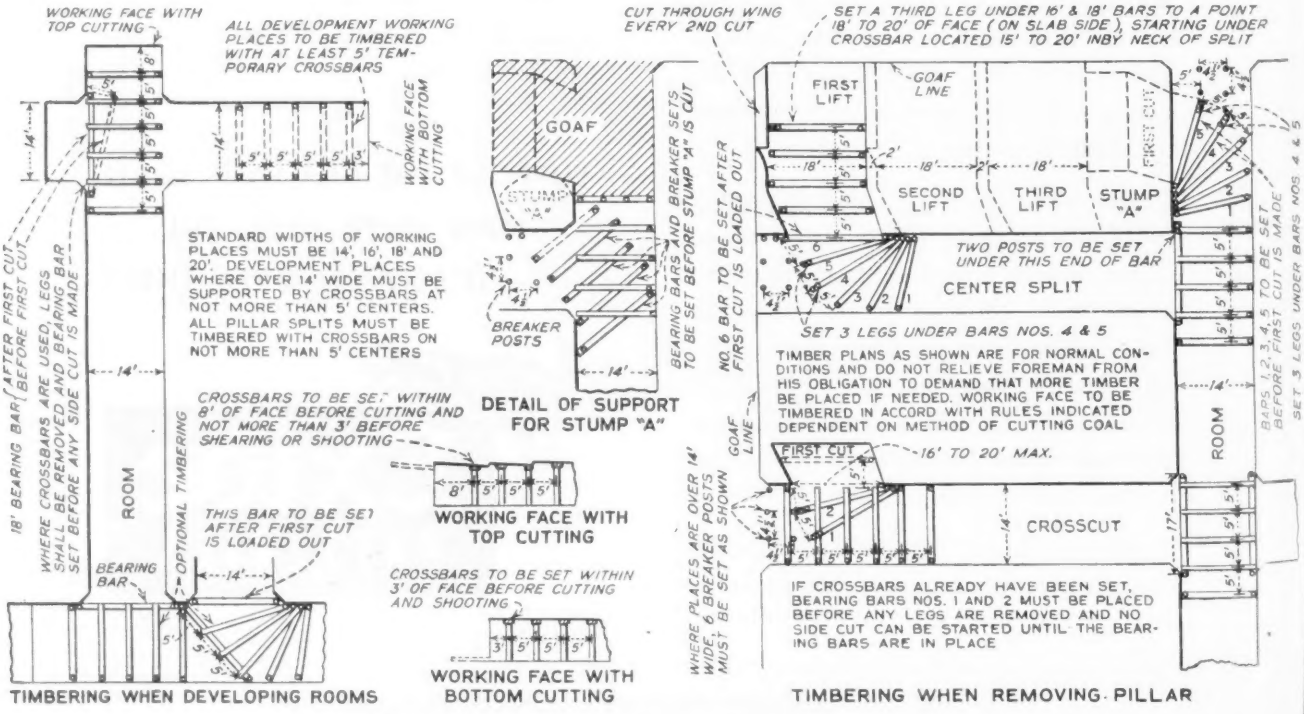
A MINE in the northeastern outskirts of Clarksburg, Harrison County, West Virginia, mining the Pittsburgh coal seam, was successful in holding the roof so long as the coal was hand-loaded, but when the loading was mechanized and shuttle cars were introduced the roof could not be controlled until the standard system illustrated herewith was adopted. What follows is based on an article presented by G. R. Higinbotham, assistant to vice president, Consolidation Coal Co., Fairmont, W. Va., before the National Safety Congress, Oct. 5.

With a thickness of about 7½ ft. and a bottom that remains fairly hard during mining operations, the coal at this mine has a very weak drawslate 4 in. to 2 ft. thick which coheres imperfectly to the stratum above. Over it is a mud shale, possibly 5 ft. thick, but thinning out altogether in places. It is without strength and when exposed to the air it absorbs moisture and falls in small pieces or in several tons at a time, breaking upward until a hard rock is reached, the only material that has permanence. The coal lies near the floor of the valleys and has a maximum cover of 300 ft.

### Untroubled Hand Loading

In hand loading, this bad top was held in place easily with posts and large cap pieces. The maximum room width did not exceed 16 ft. and as an average did not much exceed 14 ft. Caution had to be taken, of course, to prevent accidents, but no great difficulty was found in the control of the roof.

With the introduction of mechanical loading, rooms were driven on 90-ft. centers and pillars cut into blocks by crosscuts also on 90-ft. centers. Rooms and crosscuts were no more than 14 ft. wide and pillar blocks were cut in two parallel to the heading with splits not more than 18 ft. wide. Pillars were extracted in a straight line at a 45-deg. angle to the line of development. Thus the pillar blocks were 76 ft. square and were first split in the center parallel to the entry, and then lifts almost at right angles were driven from the split or the crosscut toward the goaf line. Between the lifts, thin fenders were left on the goaf side and, in most cases, no attempt was made to recover them. Pillar falls which broke the hard rock above the drawslate were made on the completion of each lift before the next was started. The workings did not squeeze or creep, and no such movement developed during mechanical loading, so the badness of the roof could not be




**Timbering Scheme to Outwit Loose Top Over Pittsburgh Bed.**

# *La-a-adie-e-ees 'n' Gen'l'men . . .*

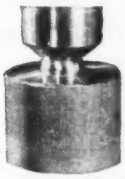
## We will now demonstrate the ma-a-arvelous strength of New Department steel balls . .



1. New Departure high carbon chrome steel ball resting on solid steel block.



2. Applying pressure with hydraulic ram, ball on its way into block.



3. It takes 90 TONS pressure to press the ball in to its full diameter.

We place the little steel ball on the big steel block. We apply pressure, gradually, increasing until it reaches 180,000 pounds. The ball sinks into the block like a stepped-on marble sinks into the ground and — PRESTO — a ruined steel block and a little steel ball looking 'round for more tests to conquer!

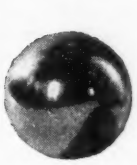
Such tests give one an idea of the toughness . . . the load-carrying ability of such steel balls as they roll in the raceways of New Departure Ball Bearings.

You see, the ball is unique in that it has no ends . . . no weak spot . . . it takes loads equally well from any direction. A fundamental reason why ball bearings are so important in this world!

Would you like to know more about Ball Bearings? We will gladly send you illustrated booklet "BM"— for the asking!

3296





*nothing rolls like a ball*

**NEW DEPARTURE**

**BALL BEARINGS**



4. Pressure removed, block is cracked and distorted but the steel ball is still round—and ready for more!

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charged to irregular mining, but was due to the inherent nature of the roof immediately over the coal.

In the first attempt at the control of the top, wood crossbars were used, set on narrow centers wherever bad top was apparent. Where conditions were particularly bad, 4- or 6-in. steel beams were placed either as crossbars or as carrying bars by which the wood crossbars in turn were supported. Two or more bars were set 12 ft. back from the face, thus giving space for top cutting. Two or more safety jacks were set before cutting, and the top cut was spragged at two or more points. All places wider than 14 ft. were timbered permanently with wood crossbars.

Finally, the plan shown was adopted as a standard. As will be noted, much use is made of radial or fan crossbars in the center split where the lifts are turned and in the room where a turn is made to get behind a stump left at the inby corner of the center split. Some of the radial bars on the outside of the curves are provided with two posts, making three posts in all.

# How Mine Fires Should Be Sealed

***British Counsel Sealing Intake and Return Simultaneously, Waiting After Sealing Not Less Than 24 Hours and Equalizing Air Pressures Round Fire Area***

AT REQUEST of the Chief Inspector of Mines of Great Britain, the president of the Institution of Mining Engineers appointed a committee to report on the best methods of sealing of mine fires, which report, the result of extensive investigation, is now available.

It stresses the importance of familiarizing employees with fire appliances and having rehearsals wherever unusual pipe ranges will have to be used. Liberal application of rock dust both near fires and stoppings is stated to be essential, though efficacy of rock-dust barriers is questioned.

### How Large Should Area Be?

If no danger exists or can arise from flammable gases, placing of stoppings close to the fire is recommended, but, if there is the slightest danger of the formation of an explosive atmosphere, stoppings should be located some distance from the fire. They always should be built in the strongest and most solid ground available. Transport facilities, the cross-section of roadways leading to the stoppings and the subsequent ventilation of the outer faces of the latter should be considered in selecting their locations, the last presumably so that any escaping gases will be promptly removed and the pressure of air on all stoppings will be nearly equal. When stoppings are being erected, ventilation should be maintained as near normal as possible.

### Sampling, Drainage, Strength

Arrangements should be made in all stoppings for subsequent sampling of gases and for measuring pressure differences between inner and outer stopping faces. Provision to drain water from inner side of stoppings may be necessary. Stoppings that may have to withstand the force of an explosion should be strongly reinforced, and adequate pressure distributors should be incorporated in their construction. All loose ground and loose roof supports where the stopping is to be erected should be removed.

### Favors Sand-Bag Stoppings

Speed in erection of stoppings is essential. Ample materials such as sand, sand bags, rock dust and suitable reinforcement should be available, and favorable transportation conditions provided. The seal should consist of 5 yd. of sand or rock-dust bags interlocked as headers and stretchers and tightly rammed when laid, adequately reinforced and buttressed by steel girders and sheets so as to distribute pressure. Sealing of intake and return should commence and proceed simultaneously. On completion of sealing, the air pressure on the outer faces of the stoppings should be equalized as soon as possible and all accessible places for some distance outside the stoppings adequately rock-dusted, unless that already has been done.

### Leave Fire 24 Hours

All men should then be withdrawn for a period, and during that period fan speed should be kept normal and cages kept at top or bottom of shafts. No one should return to the mine for at least 24 hours, which time should be governed by the composition of the gases behind the seals. In fire fighting, small birds are the readiest means of detecting carbon monoxide.

Tests for methane and carbon monoxide should be made at definite intervals and a careful record kept, even if conditions are believed to be unchanging. Atmosphere behind seals should be sampled as frequently as analysis dictates.

Oxygen content and $CO/O_2$ ratio of samples when considered with the type and position of the fire are the most reliable indications as to whether it will continue to burn or is about to die out. Feeding of inert gases into a sealed area is unreliable. Organization for meeting emergencies ocasioned by the fire should be planned in a general way before the fire occurs, thus leaving higher officials free to deal with matters of urgency and incidental variables.

### Comment on Report

In comment it may be asked: How is one to know in advance whether an explosive atmosphere will develop behind seals, so that one can decide how large an area should be sealed? What is meant by "feeding of inert gases into sealed area is unreliable"? Is it the feeding of gases or the action of the gases when fed that is in question? Some gases cannot be fed reliably unless someone is present to regulate the conditions, but some feed reliably without any attention. All are likely to be unreliable in action when fed if there is too much leakage, but with use of such inert gases, the extinction of the fire is made much more likely, because of their inertness and because of their cooling effect if they can be and are applied under pressure or as a solid (like dry ice).

•

## Burning Rubber Emits Poison Gases

Though caoutchouc, which forms from about 80 to 95 percent of the several different kinds of natural rubber, is a simple substance with a formula of $C_5H_8$, roughly 60 parts of carbon to 8 parts of hydrogen by weight, it has in it resins and proteids and, when it is made into a commercial article, it has a number of other substances added for filling, for hardening purposes (vulcanization), for the acceleration of that process and to prevent oxidation, which in turn spells aging and the shortening of the life of the rubber.

The resins are hydrocarbons and contain mostly carbon and hydrogen, though some oxygen also may be present, but the proteids contain nitrogen and sulphur, perhaps phosphorus also. To this sulphur, present in only small percentages, is added a large quantity of sulphur for vulcanization and some amino acids—nitrogen compounds—as antoxidants.

In the burning of rubber, therefore, carbon monoxide, hydrogen sulphide, carbon dioxide, hydrogen, hydrocarbons and sulphur dioxide, if not measurable nitrogen compounds also, may be liberated in quantities likely to jeopardize life or injure those who breathe the atmosphere thus created.

For these reasons, burning and distilling of insulation by heat is dangerous, especially in a confined area such as a mine. An insulation fire also is a menace to the mine itself, because the fire may be communicated to the coal, timber and methane. So, beware of insulation fires.




# Get "Double-Duty" Oil Here!

THINK TWICE before selecting your oil for coal loaders like the one shown above. Remember, here the same oil does double-duty under extremely difficult conditions:

First, it acts as an hydraulic medium for controlling the entire mechanism. Second, it serves as a lubricant to protect the transmission gears and bearings under heavy and constant shock loads.

Gargoyle Vactra Oil Extra Heavy combines the qualities required for this two-fold job. It forms strong, persistent films that resist rupture and reduce wear, resist oxidation and the formation of deposits.

Keep your loaders at the face and keep maintenance costs down to an absolute minimum with this double-duty oil!

GARGOYLE Lubricants

SOCONY-VACUUM OIL CO., INC.—Standard Oil of N.Y. Div. • White Star Div. • Lubrite Div. • Chicago Div. • White Eagle Div. • Wadhams Div. • Magnolia Petroleum Company • General Petroleum Corporation of California.

Call in SOCONY-VACUUM



# STATE-BOARD QUESTIONS

## Firebosses, Indiana

### What to Do About Open Door

Q.—An entry gives out a large volume of methane and men are working in places ventilated by the air current in that entry. If, when you are about to make your second examination of these workings, you discover that a door has been left open at the mouth of the entry, what would you do?

A.—(1) Cut off power on entry.

(2) Telephone powerhouse to shut off power in rest of mine unless door has been open less than a predetermined number of minutes based on the quantity of methane being generated by the entry. The time the door has been open should be assumed longer than that fixed for this particular entry if a prompt and reliable statement as to the time it has been open cannot be obtained.

(3) When the power is cut off the mine, close the door.

(4) Telephone to a point in entry near face and have a reliable man tell all the men to come out of the split at once.

(5) Notify the powerhouse as soon as the air leaving the split is normal. The power then can be restored as soon as the methane percentage is normal throughout the return airway.

(6) Reexamine places and let men return to work.

If the power is cut off, the only remaining hazards are the possibility that methane may be ignited by a safety lamp, that a spark from a telephone may set fire to methane or that a smoker may light a match. If the telephones are permissible, have been kept in permissible condition and their wires are in perfect order, the hazard should be inconsiderable.

In Indiana, as the return air usually travels the haulage road, the risk of an explosion anywhere along that road from sparking trolleys on locomotives is considerable, therefore all power must be cut off before any air comes from the split which has been standing without ventilation. A local disconnection of the electric current in the entry where the current of air has been short-circuited by the opening of the door is desirable if a switch for this purpose is convenient because such a switch can be operated without delay, whereas the power engineer must be telephoned, may be absent and may hesitate to do what is requested or may wait for orders from the superintendent. If the switch is at some distant point, the shutting off of power at the powerhouse, of course, will shut off the power in the split also and so will suffice.

### With Line Brattice

If the workings are ventilated by the line-brattice system, most of the methane will be lodged in the ends of the rooms and headings beyond their last crosscuts and accordingly will leave the workings before the air in the body of the rooms, whereas if the rooms and headings have auxiliary ventilation, this will continue to operate during the time the door is open and until the power in the entry is cut off. That being so, the first air arriving in the return from line-brattice workings, after the door is closed, will be highly methanous and very dangerous, coming, as it will, from the room and entry faces which have lain for a while entirely undisturbed. It is essential, therefore, that the power be cut off the main roadway and that practically means off the entire mine. That is one of the penalties of haulage on the return. Even with haulage on the intake, the removal of large bodies of methane is quite dangerous. To close the door before the power is cut off would result in the air with the richest methane being carried over the sparking trolleys.

### With Auxiliary Fans

Where auxiliary ventilation is used, the air will be mixed with the methane, and there will be no rich methane slugs to be displaced by the returning air. The danger of reestablishing the ventilation will be less, though all the methane emitted from the coal will still be in the short-circuited split. The operation of the auxiliaries without circulation of fresh air through the split, which is presumed to be the case in this instance, undoubtedly is dangerous because the fans may ignite the recirculated air, but the operation of the fans is advantageous in that it lowers the methane percentages where loading machines, if any, are operating.

However, the auxiliaries increase the hazard because they have masked the fact that fresh air is not being received and that the methane content is being steadily yet surreptitiously increased over the entire area of the split. Undoubtedly, some air is induced to enter the split by the operation of the auxiliary fans, though the quantity is almost negligible, the direction of its travel is uncertain and perhaps variable. With auxiliaries, it will take longer to evacuate the methanous air, but its removal will be less dangerous than if the air relied for its distribution on line brattice.

### What Is a Safety Lamp

Q.—What is a flame safety lamp?

A.—A lamp so designed and constructed that it will not pass into the air around it either flame or products of combustion at temperatures high enough to ignite methane in air, even when burning in an explosive and rapidly traveling mixture of methane and air. It incorporates (1) where the air enters the lamp, passages so fine that flame cannot pass outward, because these passages will cool the flame, and (2) where the air and products of combustion leave the lamp, gauzes, with openings so small and metals so conductive and absorptive of heat that the flame will be cooled below the temperature that will ignite methane.

In earlier years, instead of a gauze, perforated plates curved cylindrically around the flame sometimes were used. The ability of metal to abstract heat rapidly from flame and conduct it to places not so heated is the phenomenon back of the operation of the safety lamp.

### Explosions, How Caused

Q.—Detail the varying conditions that may cause or contribute to an explosion. What precautions would you take to correct them?

A.—Varying conditions may be:

1. Too much methane.
2. Too much coal dust.

(a) To correct excessive methane percentages:

Air must be carried to face to sweep it clean of methane.

Rooms and headings must not be carried too far ahead of last crosscut.

Air must not be allowed to recirculate, thus gathering methane with every return to the face. There must be no recirculation, specifically at the mine mouth. Sometimes some of the air returns to the mine as soon as it gets to the surface. When you talk about "circulation of air," some air really does circulate.

Doors must not be allowed to leak, nor be left open, nor be broken down, and when opened they must be promptly

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closed as soon as men or a trip of cars have passed through them.

Brattices and stoppings must not be defective.

Ventilation must not be inadequate or insufficiently speedy. Unfortunately, in most mines, where there is most methane, there is least air, for, with return, or loop, circulation, the farther the travel the less air and the lower the water gage. This can't be wholly remedied, but care can be taken to have enough air everywhere to keep methane concentration within safe limits.

Air must at all times be effectually distributed both at night or on idle days, or methane will accumulate.

Split the air currents and regulate them so as to send enough air to each mine section. Some of the air goes "sightseeing" to too many places.

Number of men should not be basis for calculating air required in a methanous mine. Quantity of gas emitted is a better criterion. Large tonnage per man makes legal allowance of air per man inadequate, as methane emittance depends on tonnage. Men don't breathe much air, and the laws allow more than enough for that purpose, being based usually on the requirement for the removal of smoke from lamps and explosives, but, to provide that methane percentages will be safe with mechanized operation, more air is needed than the laws require.

Provide sufficient airways and prevent them from being clogged with fallen rock and heaved floors.

When ventilating a large number of rooms generating methane, don't pass the methane-rich air resulting over a sparking trolley line.

### Excessive Coal Dust

(b) To correct or immunize excessive coal-dust accumulations:

Sprinkle coal kerf as coal is being cut; sprinkle face, ribs and coal piles.

Rock-dust rooms by hand as face progresses, supplementing this at times with machine rock-dusting.

Rock-dust airways and cross-cuts thoroughly before withdrawing car tracks from former.

Load out cuttings after sprinkling them.

Clean up spillage and coal dust around conveyors, especially near loading points, where once a day is not too frequent.

Clean up around shuttle-car loading stations, around car dump at foot of shaft, and where cars bump and scatter coal, especially fine coal, on tracks.

Fine coal leaves the mine in the return. See that it is not brought back into the mine by the intake.

Keep the fine dust which is released at tipple and cleaning plant from entering mine with intake air.

Clean up tracks at intervals and bring the coal out to the surface plant for dumping or cleaning. Never throw the coal wastes into rooms or heading cross-cuts.

Test for relative percentages of rock dust and coal dust and distribute more rock dust whenever and wherever the percentage is inadequate.

# State Mine Inspectors, Illinois

### Necessary Water Gage

**Q.— An airway is passing 10,000 cu.ft. of air per minute. It has a rubbing surface of 24,000 sq.ft. and a cross-sectional area of 20 sq.ft. What is the water gage producing this circulation?**

*A.*— The pressure $= \frac{ksv^2}{a}$ and the quantity of air $= q = va$

As $q = va$, $v = \frac{q}{a}$ and $v = \frac{q^2}{a^2}$

so $\frac{ksv^2}{a}$ will equal $\frac{ksq^2}{a^2 \times a} = \frac{ksq^2}{a^3} = p$

and $p = \frac{0.00000002 \times 24{,}000 \times 10{,}000 \times 10{,}000}{20 \times 20 \times 20}$

or $p = 6$ lb. per square foot.

Water gage will equal $\frac{6.00}{5.2} = 1.15$ in.,

for the weight of a body of water evenly spread over an area of 1 sq. ft. and 1 in. deep is the definitive description of 1 in. of water gage. That weight is 5.2 lb., so the answer is that the water gage producing the 10,000 cu. ft. of air is 1.15 in.

### Weight of Intake Air

**Q.— Assuming an intake volume of 37,350 cu.ft. per minute at a temperature of 32 deg. F., and a barometric pressure of 30.89 in., find the weight of air passing into the mine each minute.**

*A.*—

$$w = \frac{1.3273 \times \text{barometric pressure}}{\text{absolute temperature F}};$$

a rule to be memorized

$$w = \frac{1.3273 \times \text{B. P.}}{460 + 32} \times 37{,}350$$

$= 3{,}112$ lb.

$w =$ say, 1 1/2 tons per minute

### Equivalent Orifice

**Q.— An air current of 91,850 cu.ft. per minute is passing through a mine under a pressure of 4 in. of water gage. If later the equivalent orifice is reduced to 10 sq.ft., what quantity of air will be delivered and under what water gage?**

*A.*— First, we shall have to find the equivalent water gage of this mine, using the formula, which should be stored in the mind:

$$A_1 = \frac{0.0004 Q_1}{\sqrt{G_1}}$$

where $A_1$, is the equivalent orifice of this mine in square feet, $Q_1$ is the quantity of air in cubic feet passing through the mine and $G_1$ is the water gage in inches.

$A_1$ then $= \frac{0.0004 \times 91{,}850}{\sqrt{4}} = 18.37$ sq.ft.

Assuming that the same power is delivered to the air now that the equivalent orifice is reduced from 18.37 to 10 sq.ft., the cube or third power of the quantity will vary as the square of the area of the equivalent orifice.

Therefore $\left(\frac{Q_2}{Q_1}\right)^3$ will equal $\left(\frac{A_2}{A_1}\right)^2$

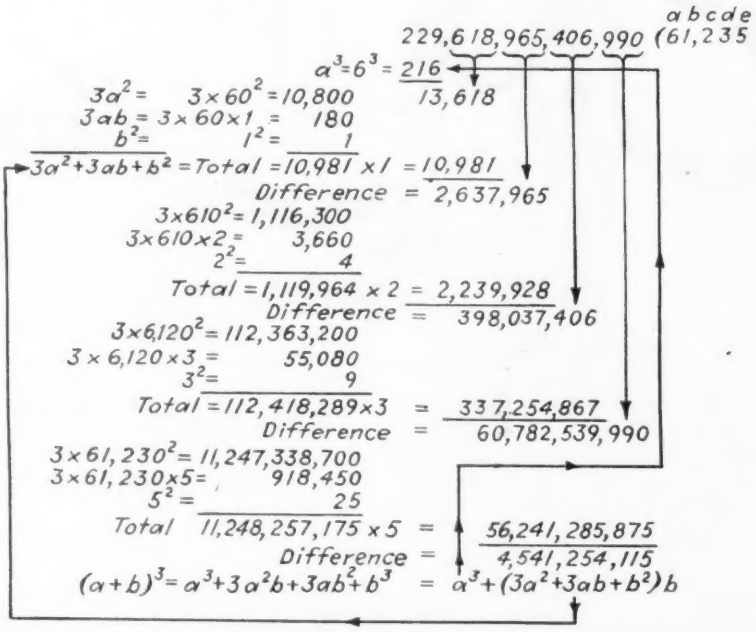
Then $Q^3_2 = Q^3_1\left(\frac{A_2}{A_1}\right)^2 = 91{,}850^3 \times \left(\frac{10}{18.37}\right)^2$

$Q^3_2 = 229{,}618{,}965{,}406{,}990$

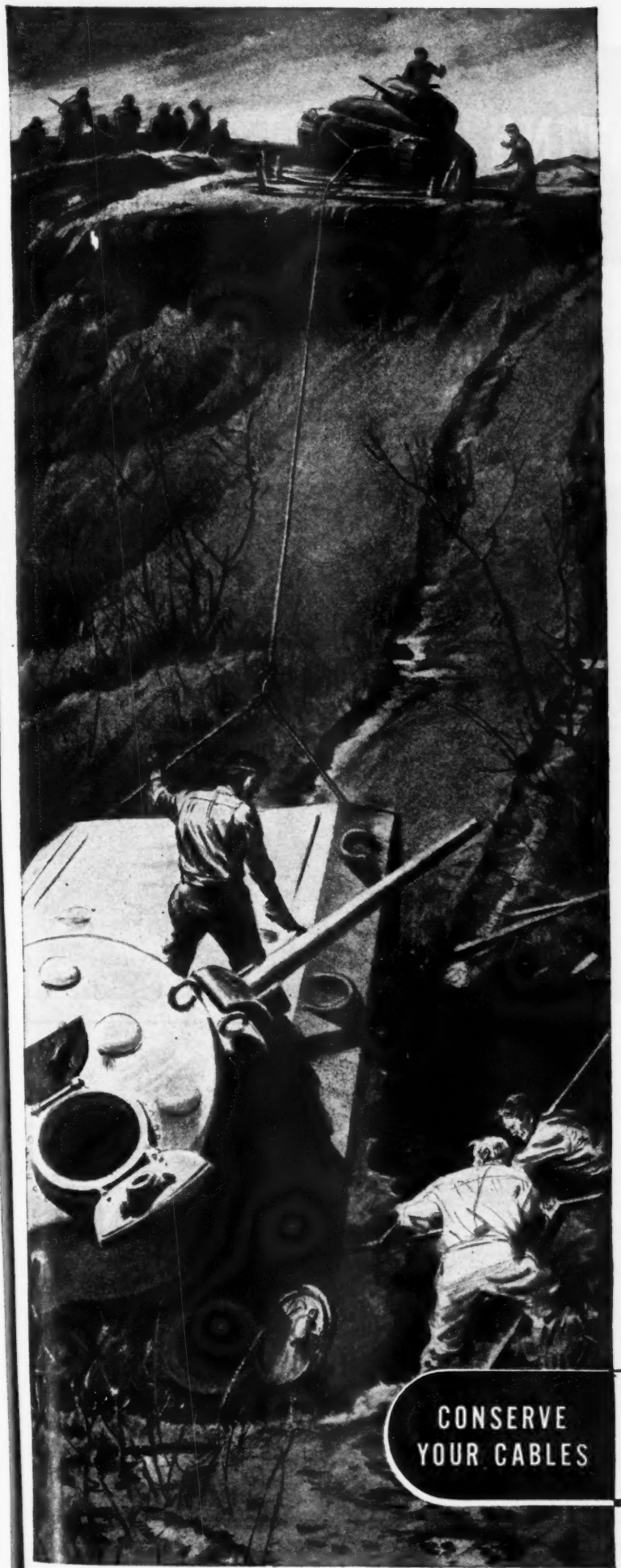
$Q_2 = 61{,}256$ cu.ft. per minute

The water gage, being the pressure on the air in terms of the depth of the water that will give a similar pressure, must vary inversely with the quantity of air traveling in each instance, so long as the resistance of the air passage and the power impressed on the air are unchanged and that is what our question postulates. This is true because power is the product of pressure and quantity and therefore, in so far as pressure increased, quantity must be proportionately decreased. Using a formula, power $= p_1q_1 = p_2q_2$

So water gage $= 4 \times \frac{91{,}850}{61{,}236} = 4 \times 1.5 = 6$ in.




**Extraction of cube root. Extended somewhat farther than necessary to illustrate operation. Equivalent orifice cannot be so closely determined.**






## "General Sherman's" insurance policy . . .

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# TIMELY OPERATING IDEAS



## Rerailers and Turnouts Protected by Concrete

RERAILERS AND TURNOUTS on main-line track protected by pads of concrete help to eliminate many delays on the main haulageway at Willow Grove No. 10 Mine, Hanna Coal Co., Neffs, Ohio. R. L. Wilhelm, superintendent, supplies the details.

The layout for a typical rerailer and a photo of a main-line turnout are shown in the accompanying illustrations. The first rerailers used oak planking instead of concrete. This scheme proved unsatisfactory because dirt packed under the boards and caused them to rise. Concrete is now used in place of the oak planking, and in the case of the turnout this pad of concrete is approximately 7 in. thick and extends from rib to rib.

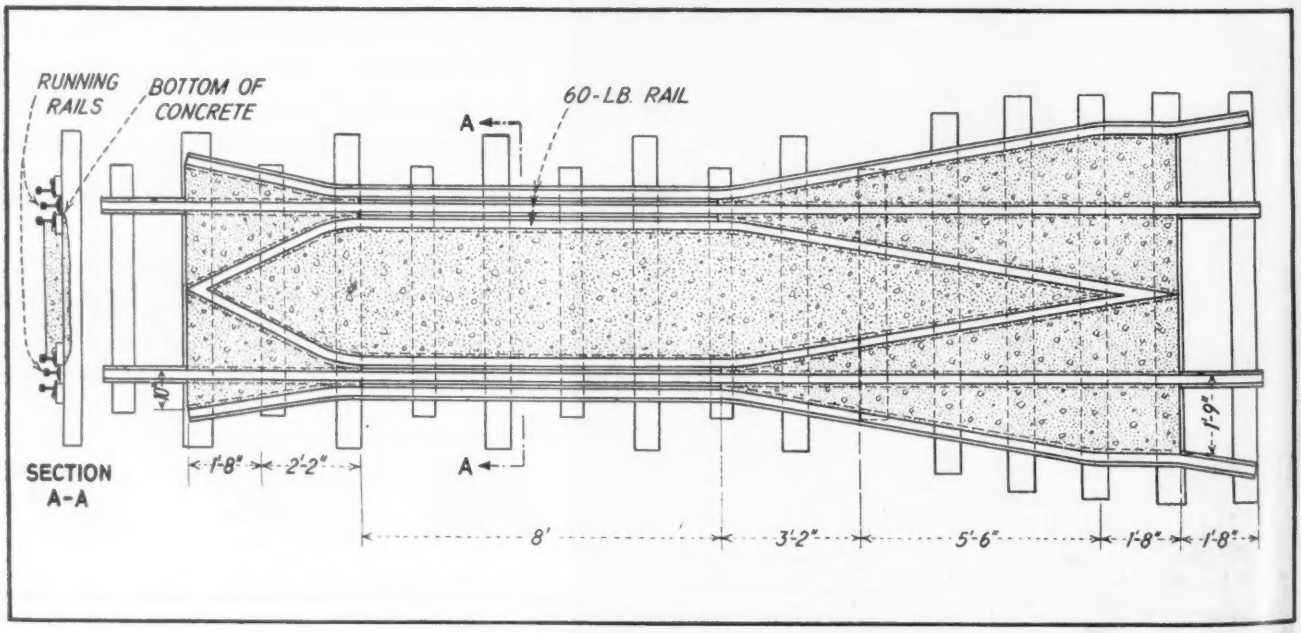
"We have three of these rerailers in use and just how often they rerail a car is unknown, as any car that is off the track when approaching the rerailer is immediately rerailed and nothing more is heard of it.

"Previous to the installation of the rerailer, it was nothing unusual for a car to be pulled into the coal dumps when it was off the track and there it would give considerable trouble, but since the rerailers have been installed we encounter no difficulties of this kind."

Referring to the main-line turnouts, Mr. Wilhelm states that prior to concreting the switch, "we were troubled with a derailed car being pulled through the switch and, therefore, tearing out or turning over the filler rails. This has been entirely eliminated by concreting the switch."



**Main-line turnout is protected by concrete pad which extends from rib to rib.**




**Layout of rerailer and how it is protected by concrete.**

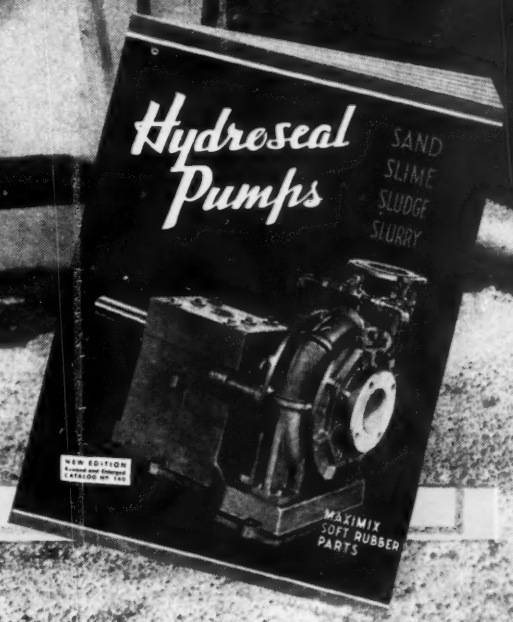
# Pumping Coal with HYDROSEAL PUMPS

Pumping coal in the moving of storage piles that grow too big or pumping coal from the washer to distant locations for storage, or pumping coal from mine to preparation plant is both easy and economical with Hydroseal Pumps. The discharge line can go anywhere, across roads, creeks, ravines, etc. for distances of one, 5, 10 or 20 miles. No roads to build or tracks to lay and no empty return trip as with trucks or cars. . . . Photo shows a Hydroseal Pump used for moving a coal storage pile. Coal is clammed into the wooden hopper where it mixes with river water via the pipe at the right. Discharge line of pump is buried beneath the coal. Water used in pumping coal can be recirculated if desired and coal may be piled as high as you wish. . . . Ashcolite Abrasion Resistant Pipe reduces maintenance of discharge line to a minimum. The Hydroseal Principle and Maximix Rubber Parts reduce pump maintenance and power costs far lower than you'd expect for such difficult pumping conditions. . . . This is only one of the many coal mine jobs for Hydroseal Pumps. Others include (1) pumping sand and sludge in coal washers, (2) pumping tipple or breaker refuse, silt or culm, to storage pile, (3) reclaiming culm banks, (4) pumping overburden in hydraulic stripping operations, (5) cleaning muck from reservoirs, underground sumps, shaft bottom sumps and air shafts. . . . Send for our 32-page Catalog No. 140 and learn the "latest" about abrasives pumping.

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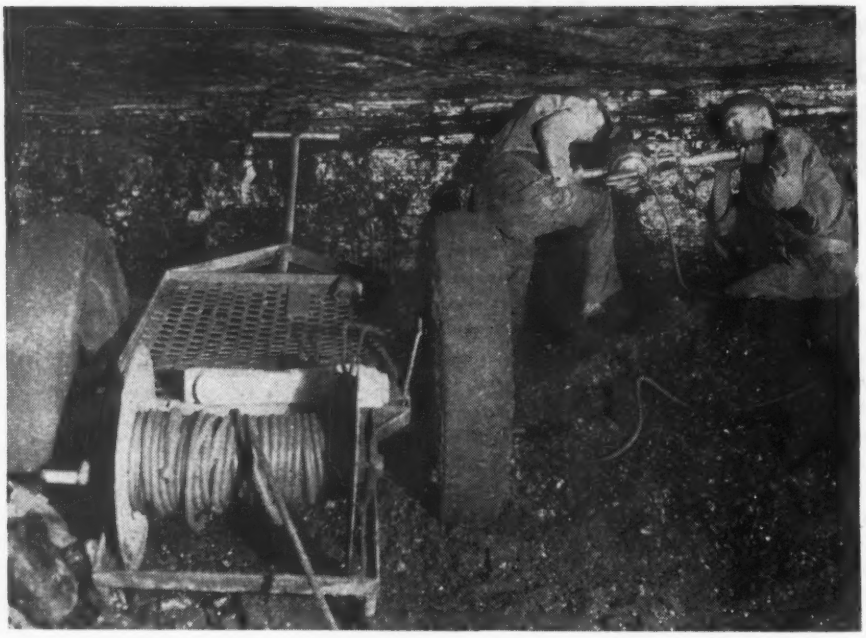
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# Drill Buggies With Reels Are Light but Strong

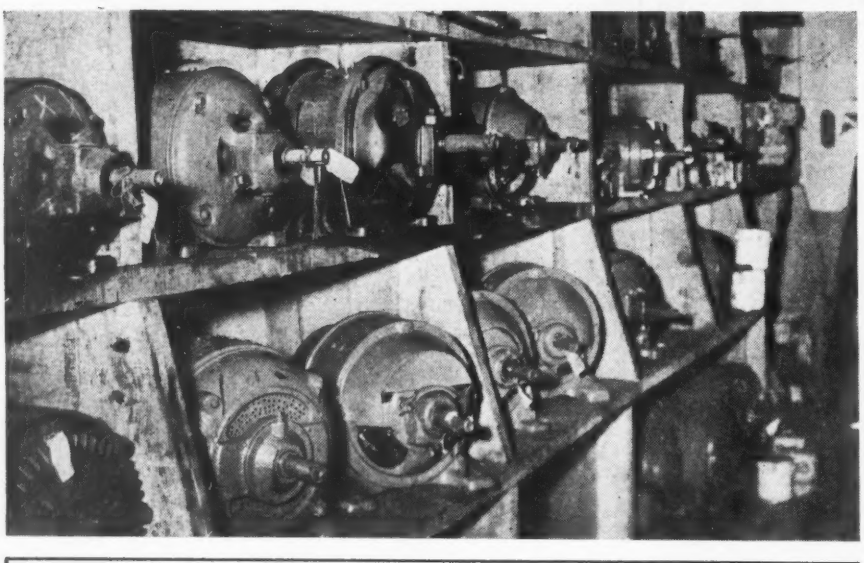


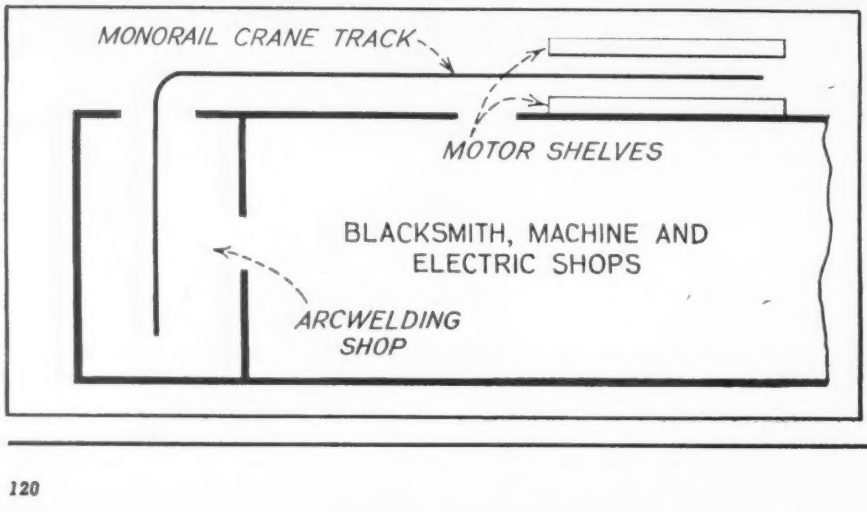
**Drilling the face of a 16-ft. heading. For transportation the drill is laid on the screen-plate deck, which is surrounded by the angle-iron frame.**

SERVING the two purposes of light weight and providing holes in which to anchor tools carried, perforated plate formerly used on coal screens forms the deck on rubber-tired drill trucks made at the shop of the Pruden Coal & Coke Co., Pruden, Tenn., for use in the mobile-loader and shuttle-car operation of the new No. 5 mine in the 42-in. Hignite seam (p. 80).

Wheels from a ½-ton Ford truck are used and these are mounted on a light-weight axle. The reel, accommodating 500 ft. of two-conductor No. 12 cable, is hand-cranked and, instead of having the complication of collector rings and brushes, is provided with a drill plugging receptacle on one flange. Bolster stakes welded to one side of the bed provide a place for carrying the augers. The flanges of a 2-in. angle-iron frame keep the drill from sliding off. A pick customarily is carried by placing its point down through one of the screen-plate holes.

# Shelves and Monorail Provide Compact Motor Storage






**Above, Left: Most of these are 3- to 15-hp. motors which have been repaired as spares for mine pumps. Left: Monorail crane serves also for putting motors on shelves.**

FREQUENTLY large floor areas of mine shops and adjacent buildings are cluttered up by storage of electric motors because adequate facilities are not provided for placing the small units—3 to 15 hp.—on shelves one above the other. That is not true, however, at the Omar (W. Va.) central shop of the West Virginia Coal & Coke Corp. Here, in a long and narrow room along one side of the main building, spare and repaired motors plus other items of machinery of comparable size are stored on shelves on each side.

These shelves are partitioned into bins by vertical planks but these were put in principally to give adequate support to the shelves above. A monorail trolley with chain block serves this storage space, a section of the yard outside and a wheel-welding and general-welding room at one end of the main shop. In the motor storage room the center space between edges of shelves is but 5 ft. and this narrowness aids in getting a motor from the chain block back into the shelf or bin space. After the motor has been raised by the chain block to the required height a plank is placed across between opposite shelves, the motor then eased down on it and pushed back into its storage space.

# THE FAR EAST

## *Frontier for American Enterprise*

IN THE great tradition of America, our frontier lies to the West. But for a United States that stretches from the Atlantic to the Pacific, to Go West is to arrive in the Far East. The feet of literally millions of our young men are now set upon that route.

Accomplishment of their objective—the defeat of Japan—will not end our responsibilities to the Orient any more than the defeat of Germany will end our responsibilities to Europe. This time we mean to see the venture through.

The first sketch of a political program for enlisting the strength of nations of good will to enforce the peace was drawn at Dumbarton Oaks. That is a good start. But those who participated know how much work remains before the blueprint becomes a fully matured plan, the plan becomes a structure, and the structure takes life and effective being in the living imagination and will of the peoples of the world.

No political accord, however high its purpose, can endure for long if it depends upon the loyalty and support of populations embittered by hopeless poverty that is offered no promise of relief. The poisonous dust of mass despair makes inevitable an ultimate explosion, whether it be sparked by a torch supplied from without or by its own internally generated heat. Much of the Far East is sufficiently close to that position to pose a grave problem to the Western world. It is of particular importance that American business men and workers alike recognize the nature of their responsibility in the matter, for to them the great area of the East presents also an opportunity and a challenge.

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The Orient—stretching in a vast semicircle from Manchuria and Japan to India and Ceylon—is the home of more than a billion people, the world's greatest potential market. In its mountains are the earth's richest stores of tin and mica; its deposits of iron ore, coal, and manganese rival those of France, Russia, and the United States. Its rice paddies are the most productive in the world, its coconut and rubber plantations the largest, and its cotton production is of major volume.

And yet, this fabulous region—with its riches of manpower and raw materials—suffers from living standards at the lowest rung of the world scale. With as much as 85 per cent of the populations of this great area devoted to the production of farm products, starvation has been an endemic plague to countless millions of its inhabitants, and will remain so until they graduate from the crudely primitive methods of the crooked stick and the bamboo plow to the use of the implements of a modern world in both agriculture and industry.

The improvement of agricultural methods and the burgeoning of industrial development depends upon tools—a preponderance of simple tools, no doubt, at the beginning, for modernization of economic processes is a development that cannot be forced at a rate faster than the ideas upon which they depend can be developed. If we, in the United States, are to hope to supply a major portion of the implements upon which the salvation of the East depends, we must be prepared to export also the skills and technologies which will make their effective use possible.

The possibility of a world market for machinery and manufactured products is a challenge that American industry cannot afford to ignore. The United States will emerge from the war with almost half of the world's industrial capacity within its borders, with much more than half of the heavy industries. Drastic and painful readjustments are inevitable; but they can be mitigated to the extent that we can find outside markets for the products for which we have excess capacity.

We shall find ourselves, at war's end, in a singularly favored position to compete in any equipment markets which are open. It is not merely that we shall have the productive capacities crying for outlets. Aside from Germany and Japan, which for some time will not be in a position to compete, our two major industrial Allies, Great Britain and Russia, will face enormous tasks in providing for their own rehabilitation. Neither of them is likely to be in a position to export more capital than they absorb; and although Canada, Sweden, and Switzerland will be, the United States will stand alone as the one major creditor nation in the world. If the potential advantages of this position are managed with wisdom and imagination, they will enormously enhance our opportunities for supplying a great share of the capital goods demand of undeveloped areas.

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What is the dimension of the Far East's potential demand? What are some of the difficulties standing in the way of its being realized?

If needs were the only measuring stick, the Far Eastern market would provide a bottomless pit into which even the great stores of our exportable capacity could be poured with room to spare.

China, alone, with its teeming population of 450 millions, has spelled out needs in dimensions large enough to stir the imaginations of the equipment producers of the world.

Business Week (February 5, 1944) supplements Dr. Sun Yat-Sen's spacious first estimates of the requirements for a thorough-going industrialization program with figures provided by current Chinese planners—25,000 locomotives; 300,000 freight cars; 20,000 passenger coaches; 20,000,000 tons of steel; and 90,000 power driven machine tools for the first five years of reconstruction. An American manufacturer of farm equipment, who recently surveyed the agricultural requirements of China, estimates an ultimate Chinese market for 20,000,000 tractors.

India's drawing-board plans are equally expansive. According to the bold pattern drawn up by a group of Bombay industrialists—some of whom are due to visit the United States early in 1945—India, after the war, will require a capital investment of $2,000,000,000 a year over the next 15 years, of which $250,000,000 per year for the first seven years will be in the form of imported capital goods.

Included on the huge import order list of the Bombay executives are mining, roadbuilding and power station equipment, heavy locomotives, metallurgical plants, agricultural machinery, and a long list of machine tools.

There can be no question of the need of these countries for the industrial equipment—and for many items of manufactured goods—which we are so eminently in a position to supply. But realism requires that we measure this demand against the Far East's probable capacity in the relatively near future to absorb industrial goods.

A Chinese economist has estimated that China, in 1937, had a total industrial capital investment of about $1,000,000,000 in American values, or something like $2.50 per capita of population. In contrast, the American investment, in manufacturing facilities alone, is now more than $600 per capita.

What it could mean in terms of capital goods requirements if China alone carries out this dream of modernizing, not to the utopian level of the United States but to the present modest level of the less developed Soviet Union, is typified by measuring just three lines: 500,000 tons of steel a

year, for five years, to add 12,500 miles to the railroad system; 2,187,500 motor vehicles; 3,300,000 telephones.

But it is one thing to cite mountainous figures demonstrating needs. It is another, and far less optimistic exercise, to find assurance that practical opportunities for satisfying such needs can be made to materialize. Let us face some of the major difficulties and see if they are insurmountable.

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The first hurdle to be cleared is the question of whether or not we want to promote the industrialization of the Far East. The wisdom of doing so has been vigorously challenged. The negative argument, on the economic side, generally runs thus: If we provide industrial equipment to backward economic areas, we deprive ourselves of the greater long-run opportunity of selling them manufactured articles which our aid has enabled them to produce for themselves.

It is only fair to say that such a thing might happen—that it has happened in isolated instances in the past. But the overwhelming weight of economic history demonstrates that the broader attitude is also the profitable one.

The United States itself is the living refutation of the fear which now cramps the outlook of many of its own citizens.

From 1790 until 1850 the foreign trade of our new fledged Nation had many of the characteristics which pertain to the trades of China and India today. We imported manufactures and we exported raw materials, agricultural products, and newly mined gold. Our imports exceeded exports, the difference being made up partly by payments to us for shipping services and partly by industrial development loans. It is relevant to inquire how the trade of the lenders was affected by this policy of supplying us with industrial capital and machinery.

From 1850 through 1939 the pattern of America's foreign trade changed. Slowly at first, and then at accelerated pace, our import ledger showed a percentage decline in manufactured goods and a percentage rise in raw materials to feed our expanding industrial facilities. But while finished manufactures declined percentagewise in our import budget, so great was the increase in our total foreign trade operations in the century from 1830 to 1930 that our imports of manufactured goods increased more than twentyfold, and they more than doubled between 1900 and 1939.

Clearly industrial Europe gained rather than suffered from the industrialization of the United States, and it is equally clear that we, in turn, shall benefit from the industrialization of the world's undeveloped territories. Further evidence is provided by Canada which, with its high industrial development but only 12 million people, buys from us each year almost as much as the relatively unindustrialized 130 million people south of the Rio Grande.

If it be granted, as I believe it must, that the development of Far Eastern countries will be to our advantage as well as theirs, the second question that we should face is the speed with which it can be accomplished. Is there genuine promise in the proximate future of opportunities for American enterprise of the magnitude set forth in the estimates quoted above?

In all fairness, I am forced to state my conviction that the road is longer than is indicated by Chinese and Indian leaders. It is natural, and far from censurable, that their eyes should be focussed upon the urgency of national needs, rather than upon obstacles in the way of their fulfillment.

On the other hand, it is possible that our own long process of industrialization may lead us to conclusions of undue conservatism. Ideas, once they break the crust of resistance are the most contagious of bacteria, and the tempo of their infiltration seems to increase by geometrical progression in a world of swift communication.

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In an interesting recent study of The International Labor Office, it is suggested that the general economic level of the rest of Asia outside Japan in the late 1930's was not dissimilar to that of Japan in 1900. Between 1900 and 1936, Japan increased its total capital investment more than threefold devoting between 10 and 17 per cent of its annual income to capital outlays. A comparable tempo of development for China, India, and other Asiatic areas would result in a capital expansion that would dwarf to insignificance the most optimistic blueprints that have been put forth to date. I am not suggesting this as a likely possibility, but rather as a caution lest we, in the name of hard-headed realism, underestimate Asiatic potentials as much as their own nationals exaggerate them.

Finally, in appraising the outlook for American enterprise in Far Eastern markets, we collide, head-on, with the problem of how we are to be paid. Here, hard-headedness can be only a virtue, for the lack of it will breed inevitable disaster for the Asiatics as well as for us.

In the last analysis, the dimension of the American market in the Far Eastern countries will be determined by the dollar exchange at their command, obtained through the products, goods, and services which they are able to provide to us, with due allowance for multilateral trade arrangements. It is true that the balance temporarily can be distorted through the extension of developmental loans. There is little question but that such loans will be in order after the war, and if they are wisely made, for productive projects that eventually will increase the exporting capacities of the countries to which they are extended, they can be thoroughly justified. But the best loans provide only a temporary expedient. In the long run, the balance of current payments must be restored with sufficient margin to provide interest payments and finally amortization of principal.

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How, then, are we to attack the problem of increasing our imports from the Orient?

In 1937, the total exports of the Far East amounted to something over $5,000,000,000—a little less than $1,500,000,000 in foodstuffs, a little more than $2,500,000,000 in raw and partly manufactured materials, and better than $1,000,000,000 of manufactured articles. Of this total, the United States purchased only about 20 per cent—approximately 10 per cent each of the foodstuffs and manufactures, and 30 per cent of the materials.

Despite changes in our technologies which will probably reduce our future takings of such important items as rubber and silk, the achievement of a high level of economic activity in this country after the war will provide a basis for increasing our Eastern imports, but only if it is an accepted part of our national policy to do so.

This means an alert and aggressive exploration of two-way trade possibilities on the part of both American business and our governmental agencies. It cannot be done by either alone.

The war has dislocated many of the trade patterns that prevailed in the past. The East is hungry for the type of products which we, uniquely, are situated to supply, but it will make its bargains with those who will not only fill its needs but will also provide outlets for its produce. Even the prewar magnitude of the exports from this area provides ample margin for the most meticulous and imaginative shopping of Eastern markets with the aim of increasing the modest share of our prewar purchases. And a farsighted program of development loans can greatly increase the capacity of these countries to produce what we want.

In general, we can trust American enterprise to explore rigorously all likely export opportunities. But the equally vigorous investigation of import possibilities will require a break from past traditions on the part of American business and American government.

Both East and West must learn to think in new patterns for the successful opening of a new frontier.



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# Armatures Used 30 Days, Then Removed for Servicing

DISMANTLING affords the only means of complete inspection of many items of electrical equipment. This holds true also as the best way to lubricate ball and roller bearings in several types of service. To go outside of mining for an example, the wheel bearings of automobiles are lubricated by dismantling rather than by a pipe connection and grease gun.

Applying these principles to mining machinery, it is the practice at Powellton Mines Nos. 5 and 6 of the Koppers Coal Division, Powellton, W. Va., to change armatures every 30 days in haulage locomotives and every 90 days in gathering locomotives. Very seldom is a bearing, field coil or winding lost and altogether there are very few gathering or haulage service interruptions due to electrical or mechanical troubles with motors. This armature-changing practice was instituted at these mines three years ago.

Taking the motor field frame apart to insert an armature affords an opportunity to inspect and repair brushes, brush rigging, field coils, terminal connections and leads. To change an armature is not a big job when it is reduced to a routine and proper tools are made available. The armatures that have been removed are put through the shop for cleaning, painting, inspection and greasing. No lubricating of the armature bearings is done between changes. Thus the bearings are not overfilled, grease does not work through the seals, time is saved and less grease used.

This practice of changing armatures does not alter the necessity for maintenance inspections. The haulage locomotives are gone over every other day and the gathering locomotives twice weekly, without fail.

# Drill Motor Pulls Loader Out of a Hole



**Fig. 1—Drill motor attached to pump-drive assembly. The machine work of joining these parts was done in the mine shop.**

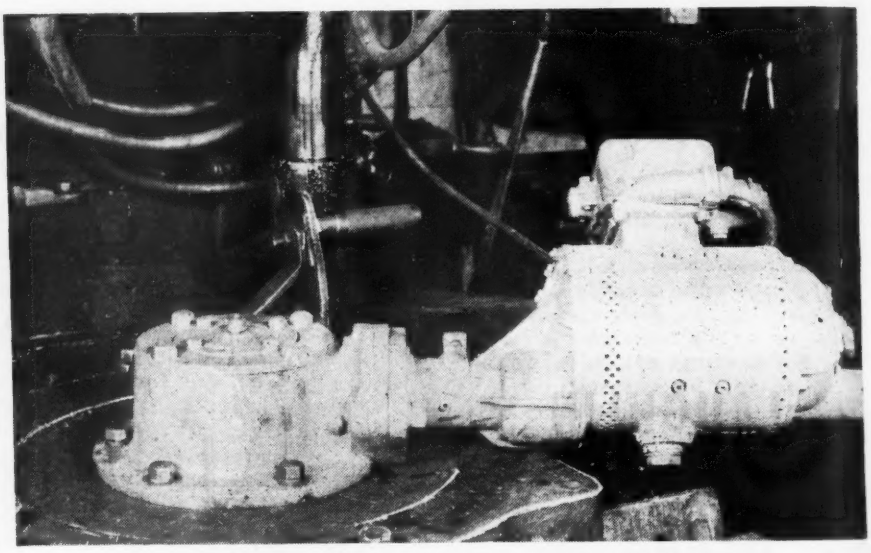


**Fig. 2—Power unit connected to the loader, ready to go.**

WHEN AN 11-BU JOY LOADER gets stuck 300 ft. back in a trackless room with the motor broken down, that is a shop job. This is how the electrical department of Mine No. 1, Bell & Zoller Coal & Mining Co., Zeigler, Ill., gets the loader to a transfer truck at the mouth of the room, using a series-wound 250-volt d.c. Chicago Pneumatic drill motor as the necessary power unit:

The drive from an 11-BU motor to the rear clutch assembly is equipped with auxiliary bevel gears to drive a hydraulic pump. These gears are housed in a casting that is readily removable. Fig. 1 shows a 474 motor attached to this same casting and its regular gear equipment. This gear assembly and motor were connected into one unit in the mine shop. This complete assembly as shown is the temporary power unit.

Fig. 2 shows this power unit attached to the loader, all ready to drive the caterpillars. It takes about 20 minutes to make this change, which includes disconnecting the loader motor. In this way only the travel mechanism is driven by the temporary power unit.

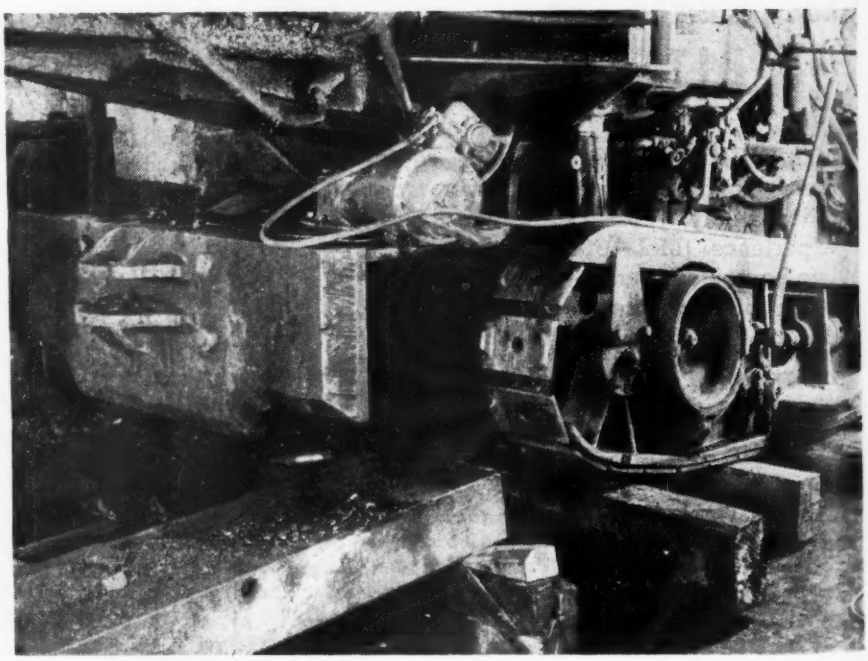


**Fig. 3—Power unit at work, pulling loader up on the transfer truck. The regular steering lever guides the loader in its tractor travel.**

Fig. 3 shows this device in action, driving the loading machine onto a transfer truck to be hauled to the underground shop. According to mine tests, 6 hp. is required to drive the machine at approximately one-third normal speed. This motor is said to develop 7½ hp. Ernest Prudent is superintendent of this mine; Andrew McMurtrie, chief electrician.

# proper lubrication

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With a background of thorough training and broad practical experience, Gulf Service Engineers are specialists in scientific coal mine lubrication. They cooperate closely with mine operating and maintenance men to lessen wear, keep equipment on the job, improve safety, increase production, and cut maintenance and power costs.

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**it pays to keep a Gulf Service Engineer "in the picture"**

Actual photo of a Gulf Service Engineer (left) consulting with Mine Foreman on lubrication of shaker conveyors.



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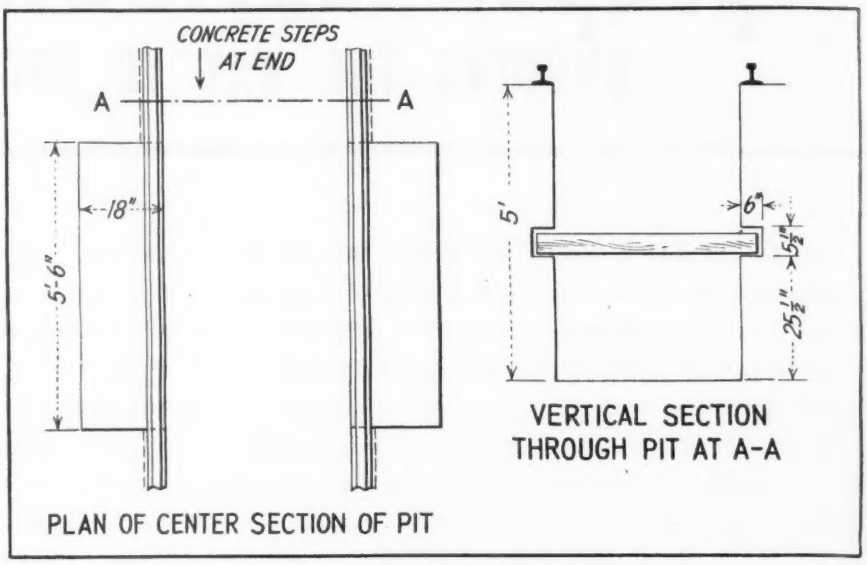
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GULF INDUSTRIAL LUBRICATION

# Slots in Side Walls Improve Pit

DESIGN FOR INSTALLING a concrete pit in a new shop deserves careful consideration so that the pit will most fully serve its purpose as an all-around aid in maintenance. In the pit in the shop at the new No. 5 mine of the Pruden Coal & Coke Co., Pruden, Tenn., slots were built into the side walls to allow inserting crosspieces or boards for temporary use.

As indicated by the drawing, the slot is 5½ in. high, extends back into the wall 6 in. and is positioned 25½ in. above the bottom of the pit. Three principal uses are evident for the slots: (1) short boards are placed across from one wall to the other to make a shelf or work bench for tools and parts being used on a job in the pit; (2) a heavy crosspiece forms a support for a lifting jack, and (3) steel cars to be straightened are anchored down to a heavy crosspiece. The shop is equipped with a bridge crane that does this car straightening.

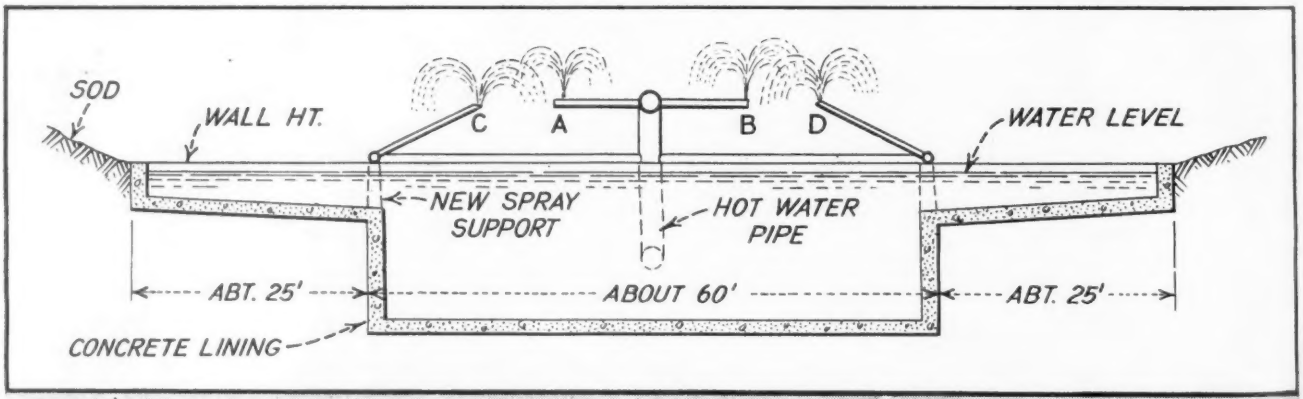


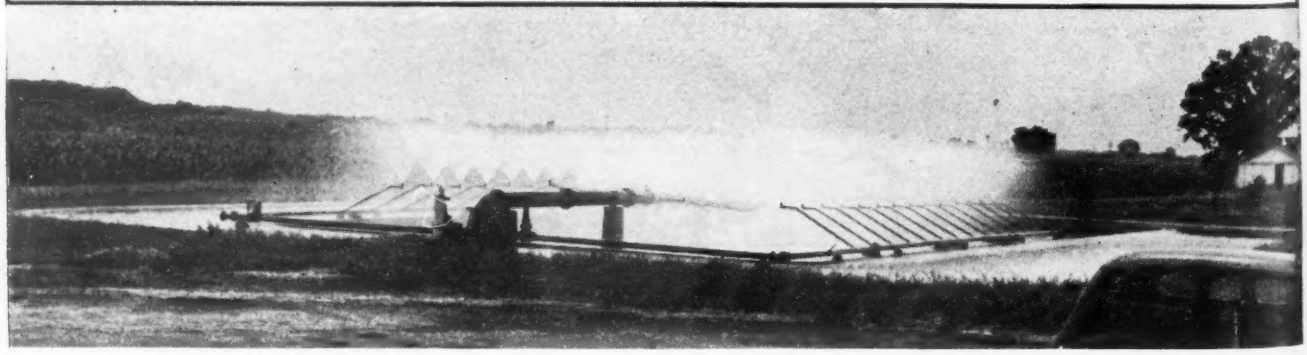

**Pit in new shop at No. 5 mine, Pruden, Tenn.**

# Enlarged Spray Pond Efficient for Cooling

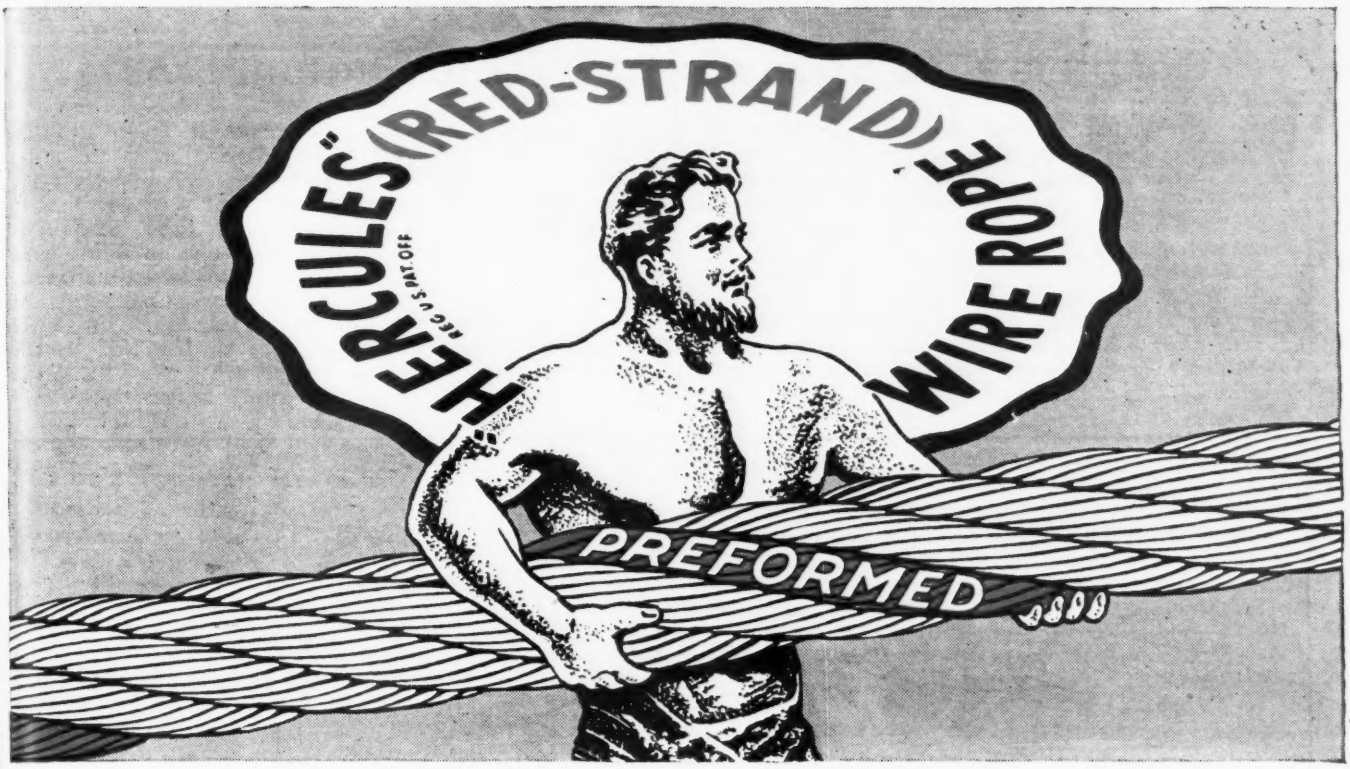
THE PROBLEM of cooling condensing water from mine power plants is solved frequently by a spray pond. Small ponds sometimes are disappointing, for several reasons: If too small, the vacuum runs low and capacity and economy are sacrificed; when more power is required they lack cooling capacity; wind will blow a large percentage of the water beyond the boundary of the pond and it will be lost; warm water is rich growing ground for plants of the algae type, which must be cleaned out quite frequently.

The spray pond shown in the accompanying picture was enlarged as explained in the caption to diagram and made more efficient for cooling. Water is saved by catching the drift within bounds and the removal of algae is made easier by the shallow wings. The cost of killing the algae is about $1 a day for chlorine.



**Spray pond after the wings and two rows of sprays were added. The outer sprays are the new ones. There was no wind and no drift of the spray when the picture was taken. The original spray pond was the central reservoir and the spray nozzles were at *A* and *B*. To increase capacity and save the water drifted by the wind, new nozzles were added at *C* and *D*, and also shallow side wings. The latter make it easier to rake out the algae killed with chlorine.**




# ITS GREATER ENDURANCE MEANS BETTER VALUE . . .

Preformed "HERCULES" (Red-Strand) Wire Rope is designed and manufactured to do today's more difficult jobs quicker . . . better . . . safer . . . more economically. Properly selected materials, plus advanced manufacturing methods, plus the specific advantages of the preforming process are the factors which add up to its better value.

What are some of the specific advantages of the preforming process? Actual service records show the following:

1

As broken wires lie practically flat, they are not so apt to injure the hands of men handling it. Also, there is less possibility of an "out of place" wire causing damage to adjacent wires in the rope.

2

It is not so easily kinked.

3

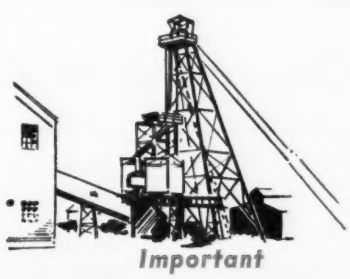
Its inert qualities make for smoother spooling and easier handling.

4

The preforming process minimizes the tendency of Lang's Lay wire rope to loop or squirm.

5

There is less turning and twisting of the rope in the grooves, and less internal movement of the wires and strands—all of which tends to reduce both external and internal wear, thereby insuring longer service.



*Important*

**Preformed Wire Rope is particularly efficient for:**

**Mining Machine Ropes**
**Scraper and Slusher Ropes**
**Car Puller or Retarder Ropes**

For *consistent* top-flight wire rope performance you can rely on "HERCULES". Let the Red-Strand be your guide. It is available in both Round Strand and Flattened Strand constructions in either the Preformed or Non-Preformed type. We shall be glad to help you select the right construction for your particular conditions.

MADE ONLY BY

## A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

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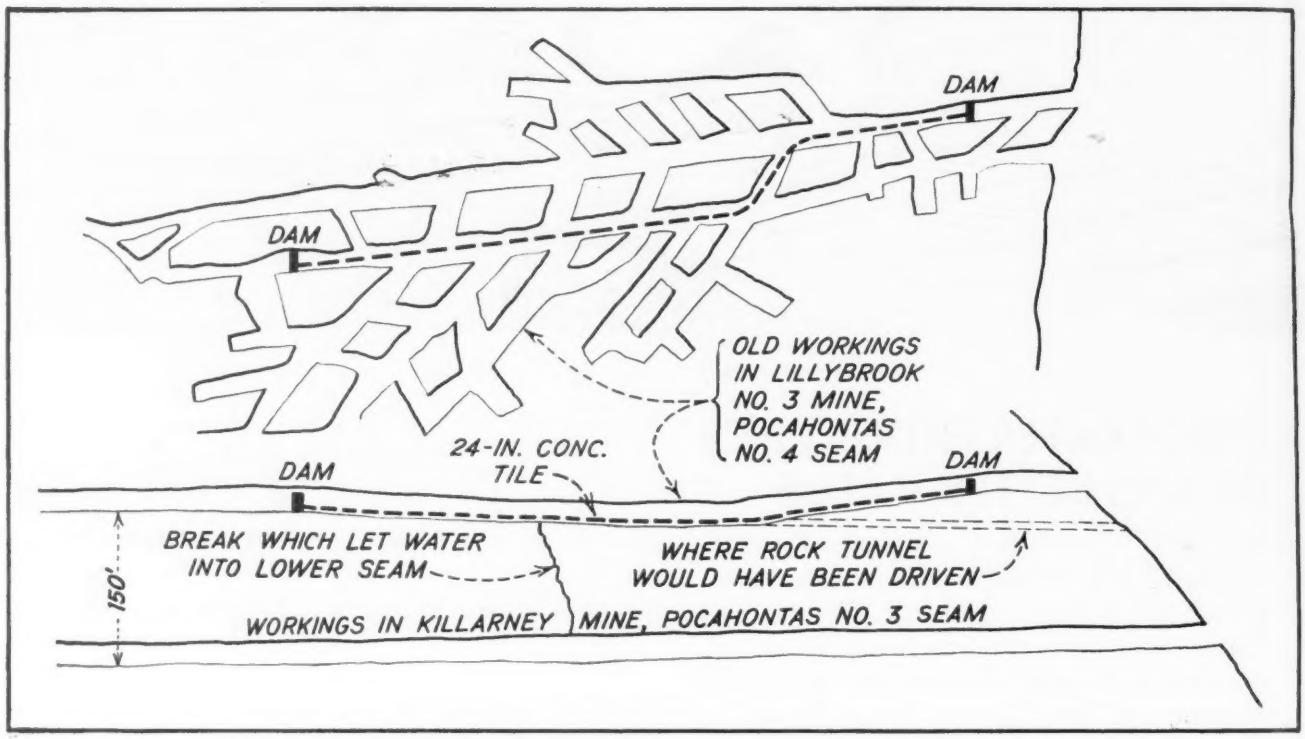
# Concrete Pipe Spans Swag Where Stratum Broke

AN INVERTED SIPHON of large concrete pipe, devised after further engineering study as a means to getting rid of water in a section of workings in the Lillybrook Coal Co., Lillybrook, W. Va., is operating satisfactorily and proved cheaper and took less time than a method first considered.

The trouble appeared when the strata constituting a 150-ft. interval broke and let water from a low place in the old workings of Lillybrook No. 3 mine into the active workings of Killarney mine, now operated by the Lillybrook company (see illustration). That low place, or swag, its lowest point about 7 ft. below its overflow to the outside, is but a few hundred feet from the outcrop, so the problem was to catch, pump or drain the water so it would no longer accumulate at that point. The first proposal was to drive a rock tunnel underneath from the outside, but that involved a problem of sealing the bottom in the vicinity of the break.

Instead of that tunnel a 600-ft. line of 24-in. concrete tile was installed across the swag. Tiles were carefully bedded on the bottom to prevent settling and the bell and spigot joints were made watertight by use of rich cement. It was necessary to install temporarily a pump with a pipeline to the outside to dewater the swag.

For the Lillybrook Coal Co., Carl Meadows is chief engineer; J. R. Craver, mining engineer; C. B. Clark, assistant general manager; and J. W. Ailstock, vice president in charge of operations.



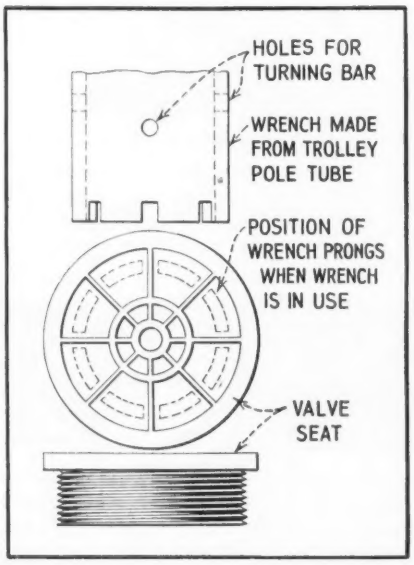

**Trouble started when a break let water into the No. 3 seam.**

# Pole Tube Converted to Valve Wrench

A WRENCH made from a Jeffrey trolley-pole tube facilitates the removal and replacement of pump valve seats, writes G. O. Crawford, night electrician, New River Co., Summerlee, W. Va.

This wrench, shown in the accompanying sketch, was developed to remove and replace the valve seats in 5½x8-in. Deming reciprocating pumps. The bottom of the trolley-pole tube is notched to slip into the valve-seat frame, using a valve seat as a pattern because it is important that the notching be uniform to distribute the pressure exerted against the various walls of the valve seat. Holes are drilled in the trolley tube for inserting a rod for turning the wrench to remove a valve seat.

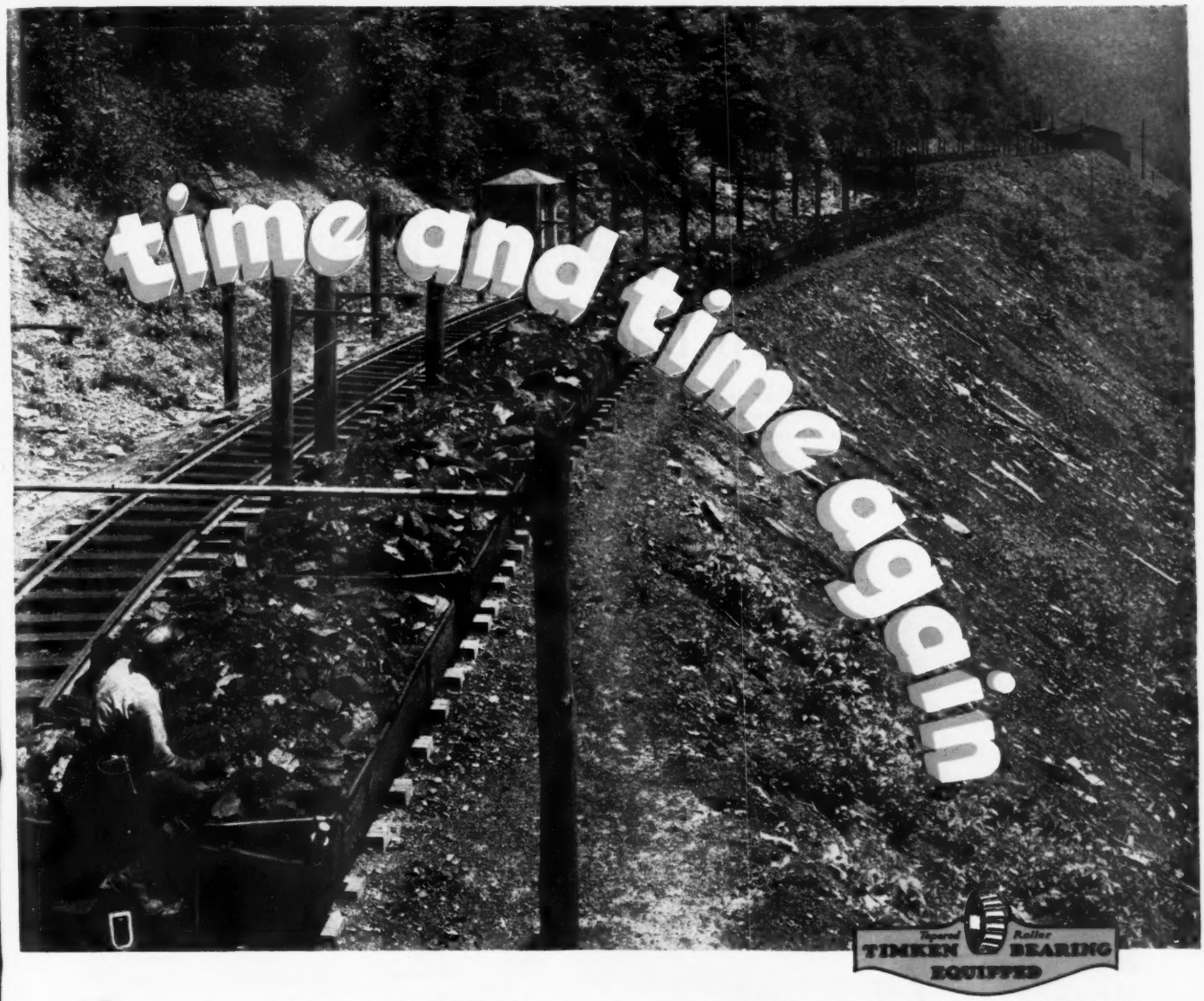
This wrench, Mr. Crawford states, has proved a very useful tool in pump maintenance work.




**How trolley pole tube is converted to a valve seat wrench.**

## *Trouble?*

Perhaps that same problem you have solved is providing a headache for some individual in some other mine. If he could read your answer in this department of Coal Age, it certainly would be a "timely" solution to his difficulty. Why not pass on your mechanical, electrical, operating or safety discoveries? Send in your idea—with a sketch or photo if it will help to make it clearer. For each acceptable idea, Coal Age will pay $5 or more on publication.




# they're "TIMKEN BEARING EQUIPPED"

Since 1929 when Pardee & Curtin Lumber Company, Webster Springs, West Virginia, placed their initial order for mine cars, they have regularly selected Timken Bearings as the most logical to equip their rolling stock. Cars shown are of modern, all-steel design in service at their Bergoo No. 4 mine as furnished by Bethlehem Steel Company.

Experience has taught them that only Timken Roller Bearings possess all those valuable features which provide maximum protection against friction, radial, thrust and combined loads; and tend to preserve wheel gauge. They appreciate, too, that with this protection comes higher speed, greater endurance and vastly reduced maintenance costs, so on four subsequent orders for mine cars, they specified Timken Roller Bearings.

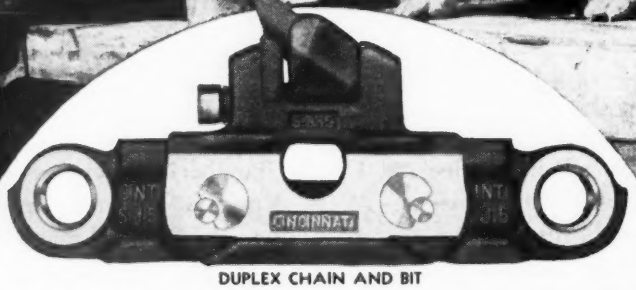
In the last 24 years more than a thousand operators have placed in excess of 500,000 Timken Bearing Equipped mine cars in operation and that number is increasing daily. Profit by these past performance records and specify Timken Roller Bearings in your mine cars, mine locomotives, hoists, conveyors, pumps, compressors and miscellaneous machinery.

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THE TIMKEN ROLLER BEARING COMPANY
CANTON 6, OHIO

# Gee! I Hope They Bite Like This When Dad Gets Back

**Like a million other boys he's proud his dad is in the army but he's looking forward to the day when dad returns. We can all help speed that day by doing a better job on the home front and the production lines that supply us with the necessities of war and civilian life.**




DUPLEX CHAIN AND BIT

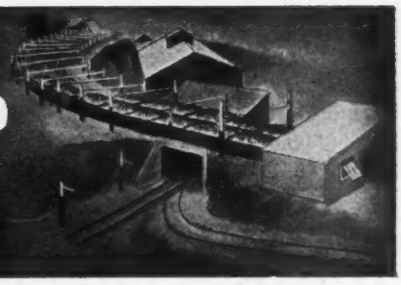
## CINCINNATI CHAINS AND BITS WILL HELP GET MILLIONS OF DADS BACK HOME QUICKER

Prior to December 8th, 1941, we took great pride in turning out sturdy, well engineered Cutter Chains, Bits, and Cutter Bars. Today we take even greater pride in building cutting equipment that can "take it." Every Cincinnati Mine employee realizes the importance of his job and he tackles it with a spirit we're proud of. Cincinnati Cutting equipment holds up under the toughest production schedules . . . requires little maintenance . . . cuts power consumption and increases production.

## THE CINCINNATI MINE MACHINERY CO.

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# COAL AGE NEWS ROUND-UP



## Congress Postpones Legislative Action

The Ways and Means Committee of the House of Representatives at Washington decided Nov. 24, by a vote of 15 to 9, not to take up coal legislation at this session of Congress. Earlier in the week Rep. John D. Dingell (D., Mich.) had introduced a bill (H.R. 5491) "to reenact and extend the provisions of the Bituminous Coal Act of 1937, as amended, until the first day of July three years after the cessation of hostilities in the present war and for other purposes." The measure was automatically referred to the Ways and Means Committee, where H.R. 4576, "to establish a National Bituminous Coal Commission as a permanent agency of the government" and in general content following the pattern of the Bituminous Coal Act of 1937, offered by Rep. John W. Flannagan Jr. (D., Va.), along with identic bills by other members of Congress, has been pending since last April.

•

## Underground Diesel Tests Prescribed

Official notice that the U. S. Bureau of Mines is now prepared to test and approve diesel locomotives for underground service in coal mines is contained in a document approved Nov. 11 and included in the *Federal Register* of Nov. 17. The document sets out types of locomotives that may be received for test, lists design requirements and methods of testing and gives recommendations for the use of diesel locomotives underground and their maintenance and inspection in service.

•

## Urges Continuation Of WPB Controls

"Present War Production Board controls on mining machinery (Orders P-56 and L-269) must be maintained because of uncertainties likely to prevail after 'Victory in Europe' Day, members of the Mining Machinery Manufacturers Industry Advisory Committee recommended at a meeting this week," a WPB release of Nov. 16 stated. Chaos would result in the industry unless the orders remain in effect, several members asserted.

Order P-56, establishing procedures for producers to obtain maintenance, repair and operating supplies for mining machinery and other mining equipment, was considered, however, for possible abolition after "V-E" Day.

Revision and retention of Order L-269 was advised by the committee. This order establishes control of production and delivery of items under List A of the order, which now contains both critical and less critical items. A suggested revision would establish a List B of less critical items such as crushers, mine lamps, grinding machinery, ore dressing and coal preparation equipment. This would facilitate the future application of production and delivery controls under the order, the committee said. Furthermore, foreign purchasers would be scheduled and required to obtain WPB authorization before obtaining $5,000 or more of machinery parts in any one month.

Mines are required to obtain ratings for machinery under P-56, a WPB official said. Under the revised Order L-269 domestic mines would be permitted to purchase repair parts, which are critical items, without WPB authorization.

•

## Roosevelt Recommends National TVA Program

Envisioning a Tennessee Valley Authority on a national scale, President Roosevelt again recommended Nov. 14 that the country be divided into seven watershed areas for development after the T.V.A. pattern. The proposal, made at a news conference, embodies exploitation of the nation's resources through six new authorities, each built around a major river.

Though he did not specify demarcations, Mr. Roosevelt mentioned T.V.A., the Missouri Valley, the Arkansas River, Columbia River and streams emptying into the Gulf of Mexico. He said he liked the idea of central management for each watershed because it provides coordinated direction which, he said, would benefit all participating states. Water control, he added, would be only a minor part of the operation.

•

## Natural Gas Lines Planned in West

Plans for construction of a $70,000,000 natural gas pipeline from the Hugoton fields of Kansas and Oklahoma to serve cities and towns in Iowa, Illinois, Wisconsin and Michigan were announced Nov. 2 by William G. Woolfolk, president of the United Light & Power Co. He said the project would be undertaken if the securities and Exchange Commission approved a proposal to liquidate the American Light & Traction Co., a subsidiary of the light and power company. The application was filed Nov. 1 in Philadelphia.

United Light engineers, he said, have worked out plans that would "provide for delivery of twice as much gas in one day as is now possible from a single line, utilizing extensive underground storage field already owned in Michigan. The storage program, he said, was designed to

## COAL ACTIVITY

### Bituminous Coal Stocks

Thousands

| | Net Tons Oct. 1 1944 | —P.c. Change— From Sept. 1 1944 | From Oct. 1 1943 |
|---|---|---|---|
| Electric power utilities | 17,773 | +1.5 | −5.1 |
| Byproduct coke ovens | 6,164 | +4.1 | −6.3 |
| Steel and rolling mills | 791 | +2.1 | −15.8 |
| Railroads (Class I) | 14,773 | +1.0 | −8.6 |
| Other industrials | 19,639 | +1.3 | +4.9 |
| Total | 59,150 | +1.6 | −12.1 |

### Bituminous Coal Consumption

Thousands

| | Net Tons Sept. 1944 | —P.c. Change— From Aug. 1944 | From Sept. 1943 |
|---|---|---|---|
| Electric power utilities | 6,656 | −5.5 | −4.5 |
| Byproduct coke ovens | 7,606 | −4.7 | ..... |
| Steel and rolling mills | 807 | −2.9 | −6.7 |
| Railroads (Class I) | 10,093 | −3.4 | −3.8 |
| Other industrials | 13,343 | +25.1 | +17.6 |
| Total | 40,458 | −2.8 | −4.8 |

### Bituminous Production

| | |
|---|---|
| October, 1944, net tons | 51,500,000 |
| P.c. change from Oct., 1943 | +4.4 |
| January-October, 1944, net tons | 523,945,000 |
| P.c. change from Jan.-Oct., 1943 | +7.0 |

### Anthracite Production

| | |
|---|---|
| October, 1944, net tons | 5,588,000 |
| P.c. change from Oct., 1943 | +4.3 |
| January-October, 1944, net tons | 54,772,000 |
| P.c. change from Jan.-Oct., 1943 | +6.3 |

### Sales, Domestic Stokers Vs. Oil Burners

| | Stokers | Burners |
|---|---|---|
| September, 1944 | 3,879 | 2,624 |
| P.c. change from Sept., 1943 | +69.1 | +320.5 |
| January-September, 1944 | 23,784 | 21,417 |
| P.c. change from Jan.-Sept., 1943 | +22.9 | +68.8 |

### Index of Business Activity*

| | |
|---|---|
| Week ended Nov. 25 | 230.7 |
| Month earlier | 231.1 |
| Year earlier | 243.3 |

* *Business Week*, Dec. 2.

### Electric Power Output†

| | |
|---|---|
| Week ended Nov. 25 | 4,368,519,000 |
| P.c. change from month earlier | .... |
| P.c. change from year earlier | −0.8 |

† Edison Electric Institute.

meet peak periods of consumption, "a new departure in the field of gas engineering and transportation."

Pacific Gas & Electric Co. and Pacific Lighting Corp. have confirmed their proposed program to take natural gas from the Panhandle and Hugoton fields of Texas, Kansas and Oklahoma to California and have filed application with the War Production Board for authority to begin actual construction in 1945.

The projected line, having a diameter of 27½ in., will be 1,000 miles long and cost about $60,000,000. It is to cross New Mexico and Arizona and be the first interstate pipeline serving California. The two California gas companies are to organize an operating company to be designated as the Texas-Pacific Pipeline Co. Authority also is being sought from the Federal Power Commission.

# Illinois Discusses Mining Problems

## *Quality Coal, Slope-Belt Repairs, Fuel Efficiency, Rectifiers and Research for Better Coke Among the Mining and Preparation Topics at Illinois Meetings*

SEVERAL of the problems of coal mining, preparation and marketing, including slope belt repairs, the national fuel efficiency program, ignitron rectifiers, coal preparation and experimental coke ovens for research with Illinois coals, were in the forefront at the 52d annual meeting of the Illinois Mining Institute, held Oct. 27 at Springfield, Ill.

With T. J. Thomas as chairman, Paul W. Moran, preparation engineer, Pyramid Coal Corp., Terre Haute, Ind., opened the technical session with a paper entitled "Rapid Belt Repairs." This related to the accidental ripping and subsequent repair of the 1,500-ft. 48-in. 8-ply slope belt at the Victory mine near Terre Haute. The damage was caused by an 8-ft. jack pipe dumped with the coal into the bin at the foot of the slope. The belt was ripped for 1,450 ft. before the signal and stop system saved 50 ft. The belt is driven by a 250-hp. motor at 275 f.p.m.

Repair was imperative, for a new belt would have taken considerable valuable time and cost $20,000. Rip plates and fasteners were located by telephone and automobiles quickly brought these repair parts from Chicago and elsewhere. Men were organized and put to work until six crews were working in multiple shifts. One rip plate and two fasteners were applied every 18 in. This major repair job required a ton of metal, cost $2,402 and was completed in 30 hours.

To prevent a recurrence all tools are now banned from mine cars, being transported in special tool cars.

In response to queries from the floor, it was admitted that there is some leakage of fine coal, as it is impossible to get a completely tight joint. There also is some noise as the fasteners click on passing over the pulleys. United States Rubber engineers, however, have developed a rubber cement in which to embed the belt clamps and thus minimize the noise.

Discussing "The Work of the National Fuel Efficiency Program," Thomas C. Cheasley, supervising engineer, National Fuel Efficiency Section, U. S. Bureau of Mines, Washington, D. C., emphasized that the coal industry is second only in size to the railroad industry. Coal has a 3,000-year reserve, with heavy competition from gas and oil, but Mr. Cheasley thinks all oil pools in the United States have been found, the existence of additional heavy reserves being problematical. Gas reserves he estimated at 100 trillion cubic feet, with few areas it could not reach.

Along with users of fuels, the coal industry is guilty of waste, said the speaker. It is found, he said, in railroad yards, overloading of cars being a contributing factor. Little is done about these wastes; mine power plants do not try to save, he complained.

Among ways of preventing waste of coal at the source, Mr. Cheasley suggested that coals from different seams not be mixed and that fresh and stale coals be kept separated. One reason for this procedure is to prevent inimical chemical reactions. He pointed out that waste prevention is good business; that the big problem is conserving coal; that a fuel shortage in some sections of the country is a certainty for the coming winter. "An old-fashioned winter," he continued, "might upset deliveries."

Prevention of waste at the consumer end is a part of this program. With 300 coordinators, he does not expect to be able to assist more than 5,000 plants to improve fuel economy. He pointed out one example where such remarkable economies were achieved that "everybody was surprised and the management almost embarrassed."

In discussion, J. A. Jefferies, Illinois



"Overdoing it a little, aren't you, Hank?"

# MORE THAN EVER YOU NEED *Securityflex*

## ...the Twin Parallel cable with these exclusive construction advantages



This cross-section shows Anaconda's twin parallel Securityflex cable with self-contained ground wire. This special cable has only slightly increased diameter, so that usual lengths may be handled on standard conductor reels. It offers a simple, convenient method for grounding loaders, conveyors, cutters, etc.

*for example...*

1. *Special D-shaped insulation* developed by Anaconda cable engineers. Prevents twisting. Impossible for one conductor to ride over the other and cause failures.

2. *Time-saving Breaker Strip* to separate the two conductors. Connections and splices can be made with greatest speed and ease. Also aids in preventing short circuits if run over by mine equipment.

3. Maximum flexibility . . . thanks to Anaconda Herringbone compensating construction.

4. Rugged Seine Twine reinforcement webbing for greater strength and to prevent tearing of jacket.

5. With all rubber covered cable war restricted *Securityflex construction features are more important than ever.* 44247

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## ILLINOIS OFFICERS

**Officers elected by the Illinois Mining Institute for 1944-5 are: George F. Campbell, president; Joseph E. Hitt, vice president; B. E. Schonthal, secretary-treasurer; executive board —Paul Halbersleben, W. J. Jenkins, L. F. Lumaghi Jr., Harry M. Moses, F. S. Pfahler, H. A. Reid, J. W. Starks, E. F. Stevens, H. A. Treadwell, Prof. H. L. Walker, James White and W. P. Young.**

Central R.R., cited an experience of storing 90,000 tons of coal and added: "In the absence of sulphur, storing new with old coals is satisfactory."

J. G. Crawford, general manager, Valier Coal Co., said "coal lost in the railroad yards is of little importance but the hidden losses are." Among these hidden losses are careless loading, overloading and banging the cars in the mine yards. Full carrying capacity of the car should be used; "55 tons can be loaded in a car and not spill."

At the close of the morning session, Robert P. Medill, Director, State Department of Mines and Minerals, acting as State Regional Engineer of the National Fuel Efficiency Section, presented the conservation pledge on behalf of the State of Illinois to Mr. Cheasley.

Presided over by Thomas L. Garwood, assistant superintendent, New Orient mine, the afternoon session began with D. E. Renshaw, mining section, industry engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., reading a paper titled "The Ignitron Rectifier in Coal Mines." Tracing the history and citing the applications of mercury-arc rectifiers, he stated that the first of these units was put into mining service in 1937. In 1940 the sealed-tube type was introduced.

Its advantages are appreciated to the extent that at present 95 percent of mining rectifiers are sealed-tube machines. This equipment is suitable for mining service, is reliable, is not damaged by short circuits, has no overspeed hazard, has favorable tube life, is more efficient than rotary equipment and is cheaper than pump-type rectifiers.

For some applications, however, the pump type may be favored, being indicated when: (1) power supply is reliable and prolonged outage infrequent; (2) peak loads exceed two times normal or average two times normal.

Sealed-tube type is indicated when: (1) power supply is subject to frequent outage or accidental or deliberate shutdown; (2) peak loads seldom exceed two times full load.

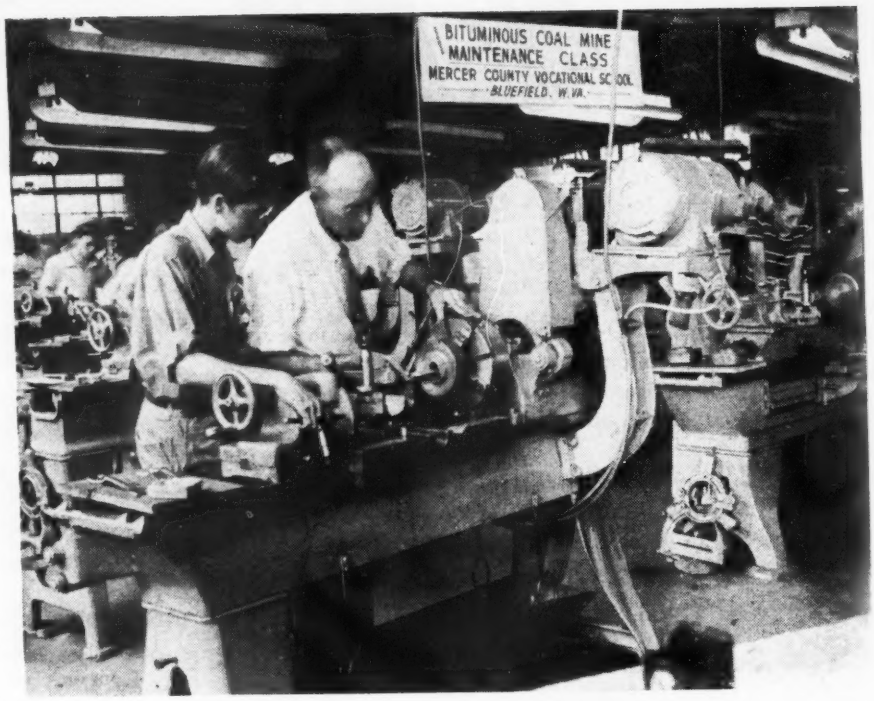
Mercury-arc rectifiers are less allergic to lightning than rotary equipment, requiring only a reasonably level floor and a minimum of attention. Capitalized losses have brought about a trend to ignitron rectifiers in preference to rotary equipment.

In "Preparing Coal for War and Peace," C. W. Waterman Jr., district manager, McNally-Pittsburg Mfg. Corp., Chicago, outlined some of the preparation problems and indicated moves to meet them. "In taking a résumé of the majority of larger producing operations in this country," said Mr. Waterman, "we find that it has been extremely difficult to maintain the more complete preparation plants principally because of the longer work week, with double and triple shifting of entire operations to establish the high production figures required for war."

During World War I, anything black sold as coal. This has not been the ase in World War II. Why? The universities have been turning out combustion engineers who can truly evaluate coal. The general public has become more B.t.u. conscious and appreciates and demands better prepared and clean coal. A general relaxation in preparation would be one of the greatest catastrophes to the coal industry in this country. All ground gained in this war period would be lost to competitive fuels in the post-war market.

During 1943, 4,640 tons per hour of






## NEW HANDS FOR COAL MINES

**Recruiting of skilled manpower will be one of coal's postwar problems. One of the better methods of instilling new blood into the industry is telling the opportunities in coal mining and training young men to take advantage of them ("Tomorrow's Miners," *Coal Age*, July, 1944). The Mercer County (W. Va.) Vocational School has started a course, with the cooperation of coal operators in the district, which includes laboratory underground work, maintenance, repair and electrical work. These two pictures show some of the 125 boys of from 14 to 18 who are enrolled. At the top they listen to an instructor as he explains underground work. In the bottom picture, one of the pupils receives instruction on a lathe in the machine shop.—Photos by Wide World.**

POWDER
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Not Living On Our Reputation—
But Building It



# SLIM-ITE HAS PROVED ITS ABILITY TO SAVE SHOVEL HOURS

National Slim-Ite Powder Series (1-2-3) is at work today in 21 strip mines in Pennsylvania . . . 19 strip mines in West Virginia . . . 14 strip mines in Ohio. And to date 54 strip mines have standardized on one of the Slim-Ites either 1, 2, or 3. Widespread use of Slim-Ite indicates its usefulness!

Hard overburden is easily removed by Slim-Ite, with the least loss of shovel hours and the greatest recovery per pound of powder.



WHY? A wide range in speed, in strength and in water resistance.

Also, it is designed to meet any overburden problem irrespective of geological structure.

These Slimites were designed after long study of overburdens occurring over coal measures in all states east of the Mississippi where strip mining is practiced.

SO — for your strip mining, Anthracite or Bituminous,—turn to National Powders. Get your overburden removed easily — economically. Write today for details.

## NATIONAL POWDER COMPANY

ELDRED (McKean County) PENNA.

Manufacturers of High Explosives for All Industrial Purposes

cleaning equipment was installed, and 1944 should show a like tonnage. Notable among the new trends in preparation have been the re-treating and recovery of coal from sludge and new principles applied to dedusting. Hydraulic desliming of sludge at 60- to 8-mesh has been resorted to prior to recleaning where large percentages of clay and semi-colloidal matter is in the sludge. Drying the ½-mm.x60- or 80-mesh to satisfactory moisture has its problems. Drying of recovered sludge has been by dewatering by upward inclined vibrating screens and then passing it on to heat dryers to finish the process. Centrifugal dryers also have been used. Sludge recovery has been proved an asset to hydraulic cleaning plants and their owners.

Coal in the refuse cannot be deposited in the bank account. In many cases minus ½-mm. sludge will account for as much as 5 percent of the total feed to a cleaning plant when cleaning down to zero. One Illinois mine proved that an average of 120 tons per day can be recovered from 1-mm. sludge at 1 to 1½ percent lower ash than the washed plus 1-mm. This natural resource has been mined at the same cost as the coarser grades of marketable coal.

Another economy is the recovery of coal formerly going to refuse, by crushing and recirculating middle-gravity refuse or re-treating secondary rejects in a separate unit. Plants producing a single refuse product may reclean this to advantage. Records exist of as high as 25 percent recovery of coal. Thus mechanical loading may be increased by avoiding selective mining. Reducing lump to egg size has reduced manpower for picking at savings up to $10,000 annually while washing everything from 6 or 7 in. down.

The following figures on the cost of clean coal with a certain percentage of rejects, quoted from Coal Age, April, 1944, sets the formula that every 1 percent of coal recovered from rejects reduces coal cost 3c. a ton:

Clean coal cost, $2.63 per ton—14 percent rejects.

Clean coal cost, $2.54 per ton—11 percent rejects.

Clean coal cost, $2.42 per ton—7 percent rejects.

Too few plants are equipped with crushing and rescreening equipment—a necessity in the preparation engineer's mind for postwar consideration. Close sizing in stoker grades must fit the customer's equipment. Preparation activity during our war production years indicates these practices paramount: (1) coal losses stopped or reduced; (2) quality of railroad fuel improved.

Midwest operators have responded to railroad market requirements by crushing to eliminate oversize that jammed the feed screws of locomotive stokers, plus giving as uniform ash content as war restrictions permitted. Multiple benefits have come by crushing prior to cleaning.

Overlapping fuel areas (coal and oil or gas) establish a battleground for markets. Gas and oil are on their toes with well-financed programs of research and promotion. Coal is the cheapest basic fuel with resources for 3,000 years—a firm foundation. Coal must be mechanized from face to furnace. Peace-time coal preparation will have increased demand for fine grades of stoker coal. To meet competition, coal must be a completely automatic fuel.



**George F. Campbell**
Newly elected institute president.

The major markets will demand better preparation in sizing and ash and sulphur reduction. The old tipple will give way to a coal refinery with a uniform product, closely sized, dustproofed with plastic sprays and clean to touch. A laboratory is a necessity to any modern preparation plant, providing information on variations in quality, losses to refuse, data for operating and adjustments, and records of shipments.

"With the spirit of close cooperation existing between operators and manufacturers of mining equipment, there is no doubt that King Coal today stands not on but is stepping over the threshold to the greatest coal era the world has ever known."

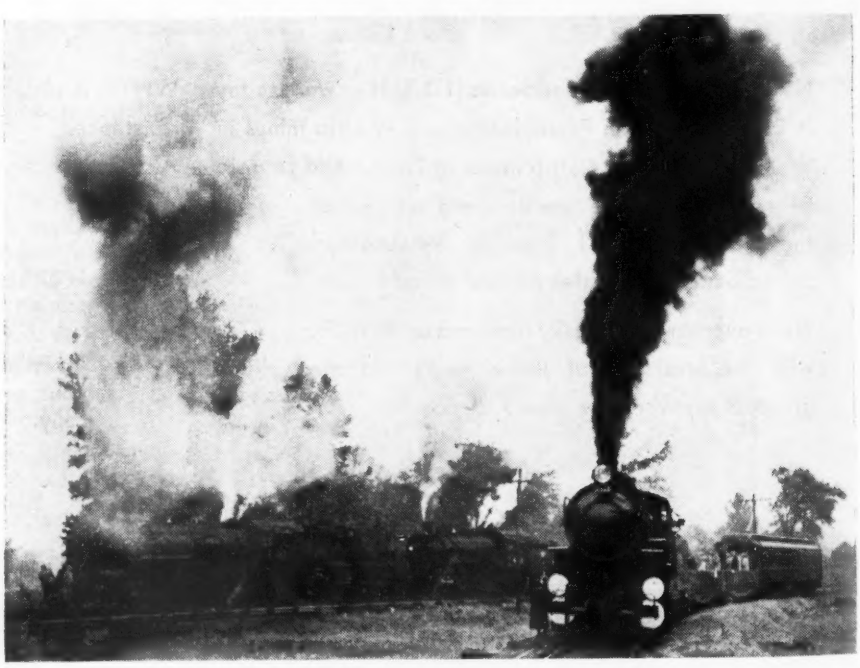
Discussing Mr. Waterman's paper, N. L. Davis, materials handling machinery division, Link-Belt Co., Chicago, stressed blending, reclaiming, washability analysis of mine-run coal and the problems of increased percentage of rejects due to mechanical mining.

"Experimental Coke Ovens for Research With Illinois Coals" was the topic of Frank H. Reed, chief chemist, State Geo-

## L. & N. to Extend Use of Overfire Jets

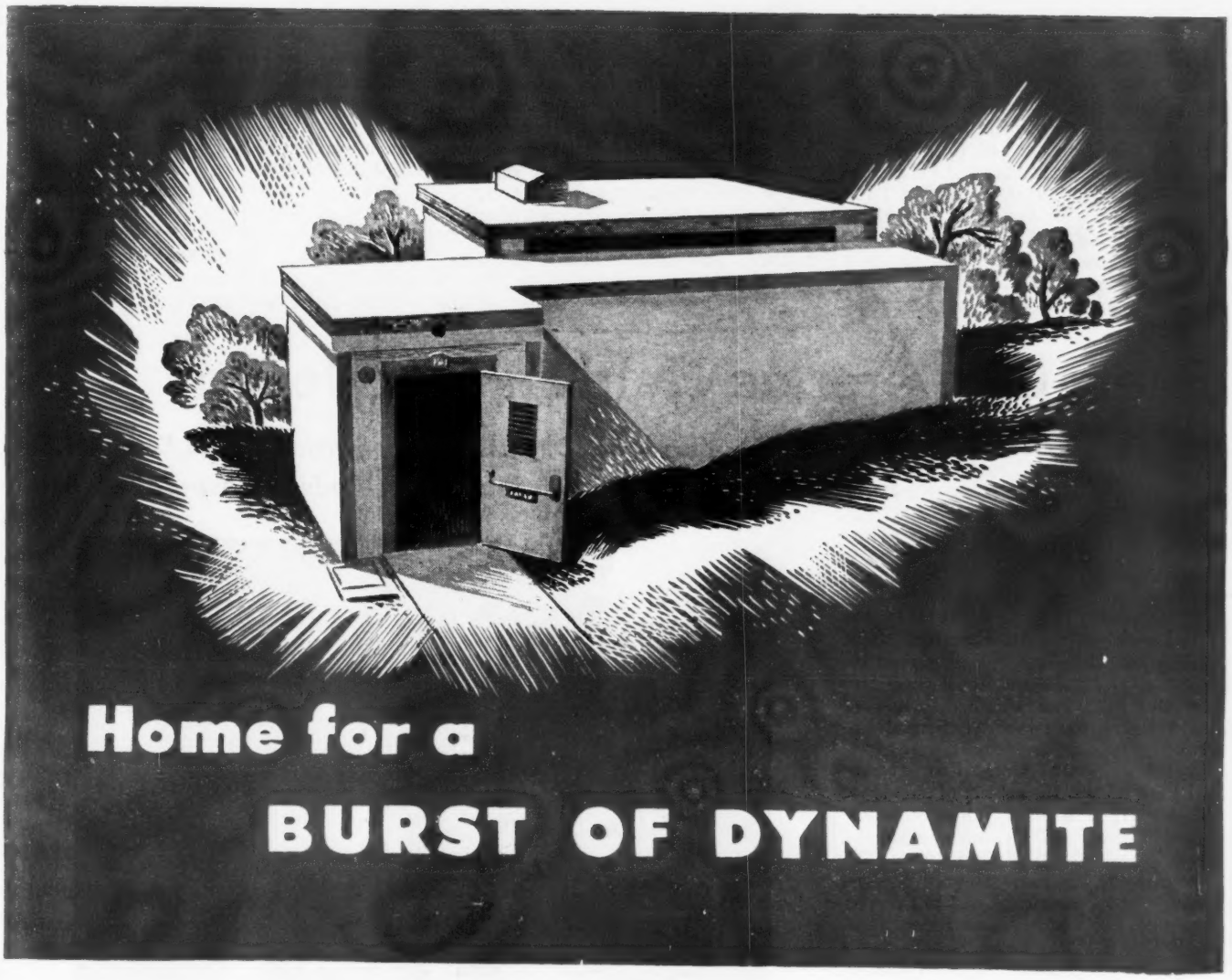
Overfire jets having proved signally successful in abating black smoke in tests on three switching locomotives of different railroads at Nashville, Tenn., the Louisville & Nashville R.R. announced Nov. 4 that half of its switching engines had been equipped with these devices and that the rest would be similarly equipped by Nov. 15.

The Louisville Gas & Electric Co. has arranged to install under one of its big boilers, at a cost of around $4,000, a new draft contrivance devised by E. F. Driver, of Chicago, to reduce smoke. Known as "overfire air," the device provides for feeding air over the fire from high-pressure nozzles, rather than usual methods of low pressure under the fire. Driver asserts that his system promotes more complete combustion, almost entirely eliminating smoke, increasing heat from a given quantity of coal as much as 20 percent, while at the same time reducing fuel consumption and costs.



**HOW STEAM JETS DISSIPATE SMOKE**

**Locomotive at left having its stack cleared of smoke by application of steam air jets; middle engine also in transition stage; unit at right has not had jets put in operation**



# Home for a BURST OF DYNAMITE



THIS BOMB-PROOF SHELTER is radically different from those on the war front. Here the "bombs" explode inside—set off by a remote control electric firing panel. A part of the hook-up is oscillographic equipment which permits the recording of firing times of various types of explosives.

Such experimental work, combined with field experience, contributes to the tremendous fund of knowledge which Hercules has accumulated over the years and is constantly enlarging for the benefit of the users of Hercules explosives everywhere.

## HERCULES EXPLOSIVES

HERCULES POWDER COMPANY
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936 King Street
Wilmington 99 . . . . . Delaware

logical Survey, Urbana, Ill., who declared that "metallurgical coke not only can be but is being made from Illinois coal." The largest reserves from which to make metallurgical coke, outside of Colorado, he pointed out, are in Illinois. At the present rate of consumption, these will last 1,500 years. Illinois is favorably situated as eastern coals disappear. Much experimentation that cannot be carried out on a commercial scale must be done in the laboratory, which is being carried out by the Illinois Geological Survey, at Urbana.

Illinois coals differ from eastern coking coals in that the former run higher in sulphur and weather more readily; likewise metallurgical coke differs from domestic coke. Commercial plants for the latter are at West Frankfort and Millstadt.

There are no guaranteed specifications for coke that will produce iron in the furnace. Low sulphur content is desirable. A coke must be tried out in the furnace to determine its value. Some of the difficulties are to obtain uniform raw material and duplicate conditions, ash, moisture and other ingredients. Even a change of ratio of the last three factors has a marked effect. For exact control, the experimental ovens are heated by electricity.

The Geological Survey has had cooperation from Granite City, where 600 tons per day of Illinois coal is used in the blast furnaces. Inland Steel Co. will soon run a test on the basis of 25 percent of eastern coal coked with Illinois coal.

# Fuels Conference Held at Charleston

## *Technical Papers and Discussions Featuring A.I.M.E.-A.S.M.E. Joint Meeting Range From Mining Methods to Disposal of Ash*

TECHNICAL PAPERS and discussions ranged from mining methods to ash disposal at the Fuels Conference held at Charleston, W. Va., Oct. 30-31 by the Coal Division of the American Institute of Mining and Metallurgical Engineers in cooperation with its central Appalachian Section and the West Virginia Section of the American Society of Mechanical Engineers.

"Fuel in South Africa, Past, Present and Future," was the subject of an address by S. H. Haughton, director, Geological Survey, and chairman, Fuel Research Board, Union of South Africa, delivered at the banquet. Howard N. Eavenson, past president, A.I.M.E. presented to J. B. Morrow, president, Pittsburgh Coal Co., the Percy Nicholls award "for notable scientific or industrial achievement in the field of solid fuels." At a luncheon meeting R. G. Lazzelle, mining engineer, Island Creek Coal Co., who was a member of the U. S. Coal Commission to Great Britain, talked on British mining conditions, methods and progress in applications of modern machinery.

Underground operating problems and preparation with mechanical loading was touched off by a paper, "Variable Seam Conditions Encountered and How They Are Met," by W. W. Beddow, vice president, Logan County Coal Corp. He brought out the advantages and disadvantages of departing from the simple 5-step cycle (timbering, cutting, drilling, shooting and loading) which loads everything in the seam and in addition any impurities from the top and bottom and results in a reject of 15 to 40 percent. To reduce or eliminate the loading of impurities at the face requires complicated cycles that may have twelve or more steps. For each mine the operator must choose the particular cycle in the 5- to 12-step range which best suits the over-all picture and must not change the cycle too often lest it confuse the crews and reduce production.

Mr. Beddow briefly summarized the natural conditions, mentioning some of the successful methods in the seams worked in that section. These are the Eagle, Powellton, Island Creek, Chilton and No. 5 Block. He placed at "some-



**Chairman, co-chairman and speakers Monday morning—seated: C. E. Lawall (left), Chester A. Fulton, E. G. Bailey and C. C. Dickinson; standing: A. H. Cannon, T. C. Cheasley, W. G. Christy and W. B. Hurley.**



**Co-chairmen and speakers Monday afternoon: L. A. Shipman, new chairman, Coal Division (left); C. C. Wright, J. D. Clendenin, H. F. Hebley and H. C. Carroll.**



**Tuesday afternoon: E. J. Kerr, D. S. Frank and B. A. Landry.**

# YES, THIS IS A *Casting...*

**but it has ⅓ greater tensile strength and is 30% harder**



## It's *Pomoloy* —the super-tough, longer-wear... metal found only in POMONA PUMPS!

This major metallurgical advancement—*Pomoloy*—is another reason why Pomona Pumps outlast, outperform... another reason why Pomonas have built such an enviable record for handling the toughest jobs year-in, year-out, with higher efficiency, less maintenance and minimum overall cost per year of service!

Pomoloy is a superior type of iron developed in Pomona Pump's own foundries *and used on* ALL *parts of Pomona Pumps where ordinary cast irons would normally be used.* Pomoloy is readily cast into any desired shape, yet embodies advantages far superior to conventional cast irons. Instead of the brittle, low-strength properties characteristic of conventional cast irons, Pomoloy is much tougher, denser, and has ⅓ greater tensile strength... 30% higher Brinell!

And instead of the rough, porous finish to which ordinary cast irons machine, Pomoloy finishes to a smooth, friction-free surface that boosts operating efficiency, reduces erosion and greatly lengthens pump service.

### HOW POMOLOY IS DIFFERENT!

Look at the illustration above of a spring machined from a solid cast bar of Pomoloy. Note the amazing toughness and flexibility of this metal. Imagine doing this with ordinary cast irons!

***Here's the reason for Pomoloy superiority.*** These photomicrographs, both at the same magnification (100x), show how the structure of Pomoloy differs from that of high grade cast iron. "A" is the magnified view of high grade cast iron. Note how the long streaks of graphitic carbon criss-cross the metal matrix, breaking it up into small, weak areas. These carbon streaks form boundaries along which fractures readily travel and through which corrosive elements can work into the heart of the metal. They cause a rough, porous surface when machined and prevent the metal from taking a high wear-reducing polish. In short, this coarse, broken structure is what gives cast iron its characteristic low-strength properties.



A



B

Compare this structure with that of Pomoloy at "B." Although Pomoloy contains essentially the same amount of carbon, more of it is in combination with the metal as iron carbide, giving added hardness. And what graphitic carbon remains is uniformly dispersed throughout the metal, permitting the metal matrix to form a strong, almost solid body.

### WHAT POMOLOY MEANS ON YOUR PUMPING INSTALLATIONS!

- Because Pomoloy finished surfaces are much harder, Pomona Pumps outwear others and require less maintenance.
- Pomoloy, being denser and tougher, resists erosive action of sand and gravel... lasts longer between re-bowl jobs.
- Because Pomoloy is stronger and more shock resistant, Pomona Pumps stand up year after year on the toughest kind of heavy-duty service.
- Because Pomoloy finishes to a smoother surface—and stays smoother—there is less operating friction and greater lifetime efficiency in Pomona Pumps!

Pomoloy iron construction is just one of many vital advantages built into Pomona Pumps. Before you invest in any pumping equipment, get the full story on Pomona performance from your nearby Pomona dealer. Or write direct!

**Send for Bulletin C-12, which gives further details on Pomona engineering!**

## POMONA PUMPS

**FAIRBANKS, MORSE & CO.**

CHICAGO 5, ILLINOIS • POMONA, CALIFORNIA

FAIRBANKS-MORSE PRODUCTS: DIESEL LOCOMOTIVES • DIESEL ENGINES • GENERATORS • MOTORS SCALES • PUMPS • STOKERS • RAILROAD AND FARM EQUIPMENT



**Co-chairmen and speakers, Tuesday morning—seated: R. H. Morris (left) and Ralph A. Sherman; standing: W. T. Brown, E. C. Carris and W. W. Beddow.**



**Luncheon Tuesday: D. S. Frank, R. G. Lazzelle (speaking), A. W. Thorson and Velcair C. Smith.**



**At the banquet J. B. Morrow speaks briefly after having received the Percy Nicholls award. Seated are S. H. Haughton (left), Harry G. Kennedy and A. W. Gauger, retiring Coal Division chairman.**

where under 48 in" the seam thickness too low for mobile loaders and where conveyors are used. Extremely bad top conditions are worked with chain conveyors and the impurities thrown across the conveyor into the gob. Shaker conveyors with duckbills, where conditions are suitable, produce a larger tonnage per face man than chain conveyors, but as for impurities, "like mobile loaders, their eyes are bad" is the way Mr. Beddow put it.

"If ever there was a time," said E. C. Carris, preparation manager, Island Creek Coal Co., "in the history of the bituminous coal industry to gain good will and patronage it is now and not after this war is over." At the conclusion of his paper on "Preparation Plant Problems Under Mechanical Mining" he said the industry as a whole has "done everything humanly possible, under adverse conditions, to keep the quality of the preparation up to standard," but called attention to the shortsighted policy of that few who have taken advantage of the situation to go lax on preparation, who made no effort to install dustproofing substitutes when oil was not available and now with oil available will make no attempt to dustproof their coals.

Using slides for illustrating many points, Mr. Carris dwelt principally on the difficult problems that the conversion from hand to mechanical loading has introduced "in the preparation plant of yesterday as well as in the streamlined plant of today."

*Problem 1, Large Impurities*—More time and thought should be given to this consideration in the design of new plants, especially if there are heavy partings or drawslate and the whole seam is mined. Mr. Carris showed slides of gadgets applied to existing picking tables to reduce the labor of eliminating large chunks of refuse and stated that installing a rock crusher at the bottom of a gravity chute under the picking table is a step in the right direction.

*Problem 2, Spraying at the Face*—Improper use of any dust-allaying liquid or equipment will bring difficulty in screening and air-cleaning fine sizes. But, said Mr. Carris, it is possible with proper supervision to reduce the dust nuisance considerably without adversely affecting the preparation of the coals.

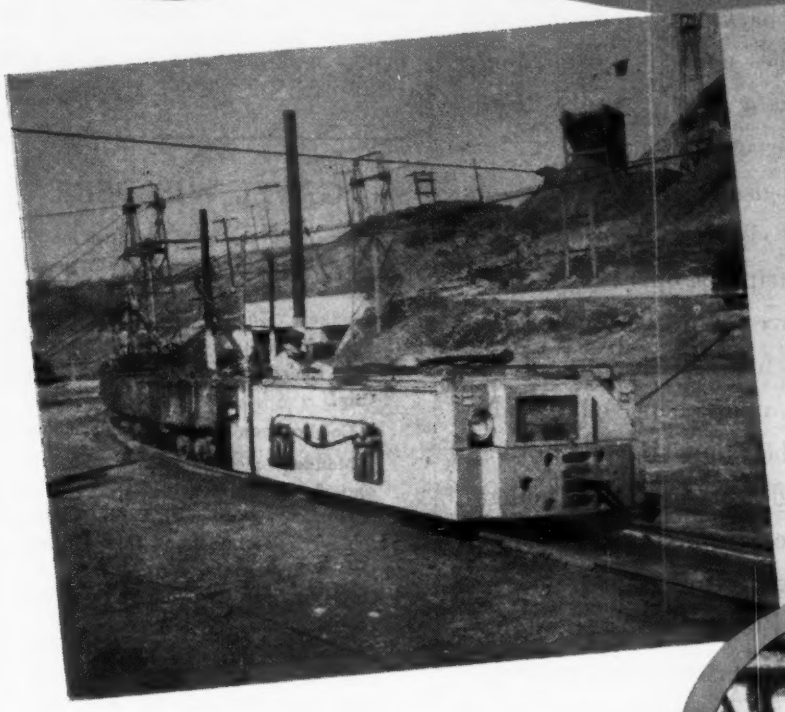
*Problem 3, Tramp Iron*—Tramp iron has been considerably increased by mechanical loading and Mr. Carris sees the necessity for its removal ahead of the mechanical-cleaning equipment to prevent damage to such equipment. He showed a slide picturing piles of valuable machine parts and supplies recovered by a magnet installation which is rapidly paying its cost by this secondary advantage. It collected $100 worth of materials in ten days.

*Problem 4, Increase in Fine Coal*—Seldom if ever is mechanical loading introduced without decreasing the percentage of plus 2-in. coal and increasing the percentage of all the smaller sizes including dust. Although there is an increasing demand for finer coals, a sizable market for lump will exist for the next ten years and face preparation and loading should be such as to keep the raw coal as coarse as possible, that being highly important for efficient and economical operation of the plant.

*Problem 5, Increase of Impurities*—In seams with heavy partings and/or friable drawslate, mechanical loading brings a tremendous increase in impurities in the raw coal. If great care be exercised in the selection and application of the process, wet cleaning can do a good job on the sizes above ⅜-in. For the minus ⅜-in., if reasonably free of surface moisture and the minus 14-mesh is not too heavily

# Taking it Away Faster

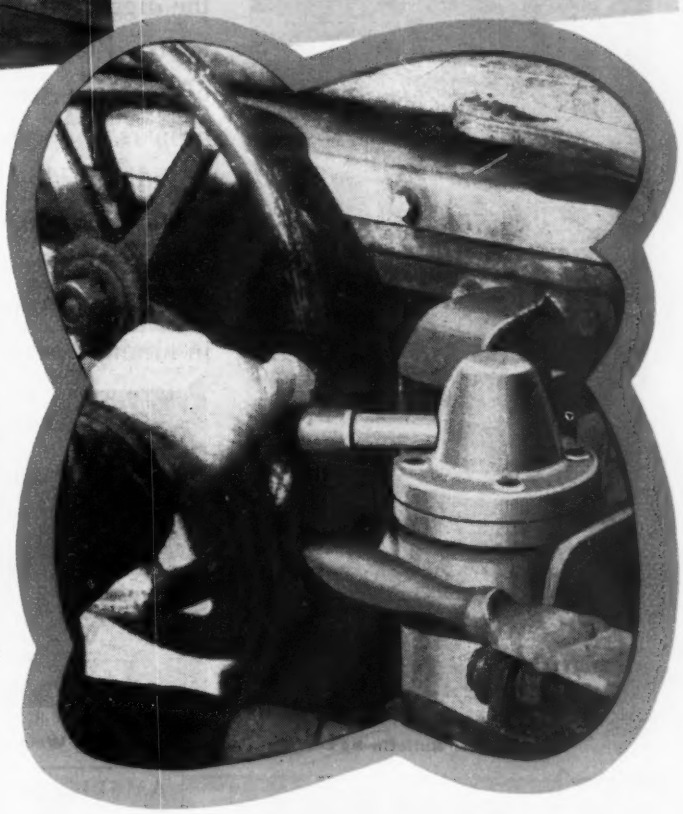
## with WESTINGHOUSE HYDRAULIC BRAKE



**SPOTTING**
**GATHERING**
**HAULAGE**

**Mine locomotives move at a faster pace when equipped with this quick acting power brake.**

*Its quick response permits accurate spotting.*
*Its graduated control permits faster gathering.*
*Its braking power permits haulage of greater tonnage at higher speeds—safely.*



**The exclusive "pressure graduating" type of brake valve adjusts the brake pressure up or down in large or small steps as the handle is moved forward or back. Operation is just about effortless and the handle itself holds its position for any pressure.**

**Compactly designed to meet space limitations on small locomotives, the brake system is easily applied without changing the standard brake levers. It can be installed when locomotives are in the shop for their regular overhaul.**

## WESTINGHOUSE AIR BRAKE CO.

**INDUSTRIAL DIVISION - WILMERDING, PA.**

# This Big Dipper Gave 4 Yards More Capacity, Yet Weighed 5 Tons Less

In dippers for big stripping shovels, the strength and toughness of austenitic manganese steel have often made possible increased capacity with less bucket weight.

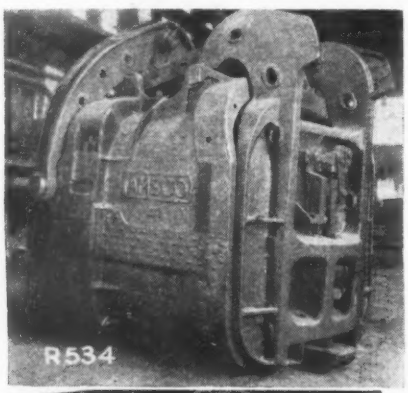
The 18-yard Amsco renewable lip dipper shown in pictures R-534 and R-536 replaced a 14-yard dipper at an Indiana coal-strip mine.

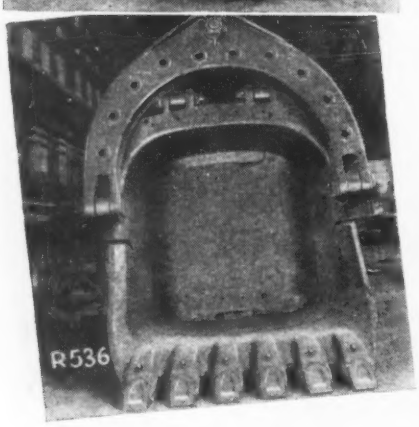
With a height of 11'6" and a width of 9'6", it weighed 48,850 lbs., or 10,150 lbs. less than the dipper it replaced; a saving of 5 tons in dipper weight, plus an increased capacity of 4 yards in every bite. Reduced power consumption helps keep down the cost per ton of material handled.

This type of dipper is made entirely of manganese steel castings except for rivets and the like; and consists mainly of three pieces; back, front and renewable lip. The door is a one-piece manganese steel casting with the hinges cast integral.

Well designed Amsco dippers of all sizes are employed in many stripping operations, where they have established noteworthy records for high output, long life and low maintenance charges. No matter how tough the overburden, the tough work-hardening manganese steel is highly resistant to the digging stresses and abrasive action. Picture C-522 shows one of these big Amsco renewable lip dippers in operation.

Bulletin 743-M, "The Toughest Steel Known for Mining Equipment," pictures and describes many more Amsco dippers used in mining operations.







Send for Bulletin 941-W on Amsco Conservation Welding Rods.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN Brake Shoe COMPANY


contaminated with impurities, the pneumatic process is satisfactory. It is important, however, to remove a large part of the stagnant dust from the feed to aid stratification and mobility of the mass on the cleaning unit.

Mr. Carris expressed the opinion that it is possible by research to find means of greatly improving air cleaning of 10-mesh coal. Wet washing is accomplishing satisfactory results on fine coals but has many costly operating disadvantages.

Discussing the paper, D. H. Davis, production control engineer, Pittsburgh Coal Co., placed a 14- to 20-mesh bottom limit on air cleaning and emphasized the need for mining methods which will keep the fine coals cleaner. Large impurities are a plant difficulty in the Pittsburgh field even though selective mining

## GAVEL WIELDERS

**Opening session, Monday morning: Presiding, C. E. Lawall, president, West Virginia University; speakers, Chester A. Fulton, president, A.I.M.E., and president, Southern Phosphate Corp., New York City.**

**Co-chairmen Technical Sessions:**

**Monday morning, C. E. Lawall and A. H. Cannon.**

**Monday afternoon, E. R. Price, general superintendent, Inland Steel Co., Wheelwright, Ky., and H. F. Hebley, director of research, Pittsburgh Coal Co.**

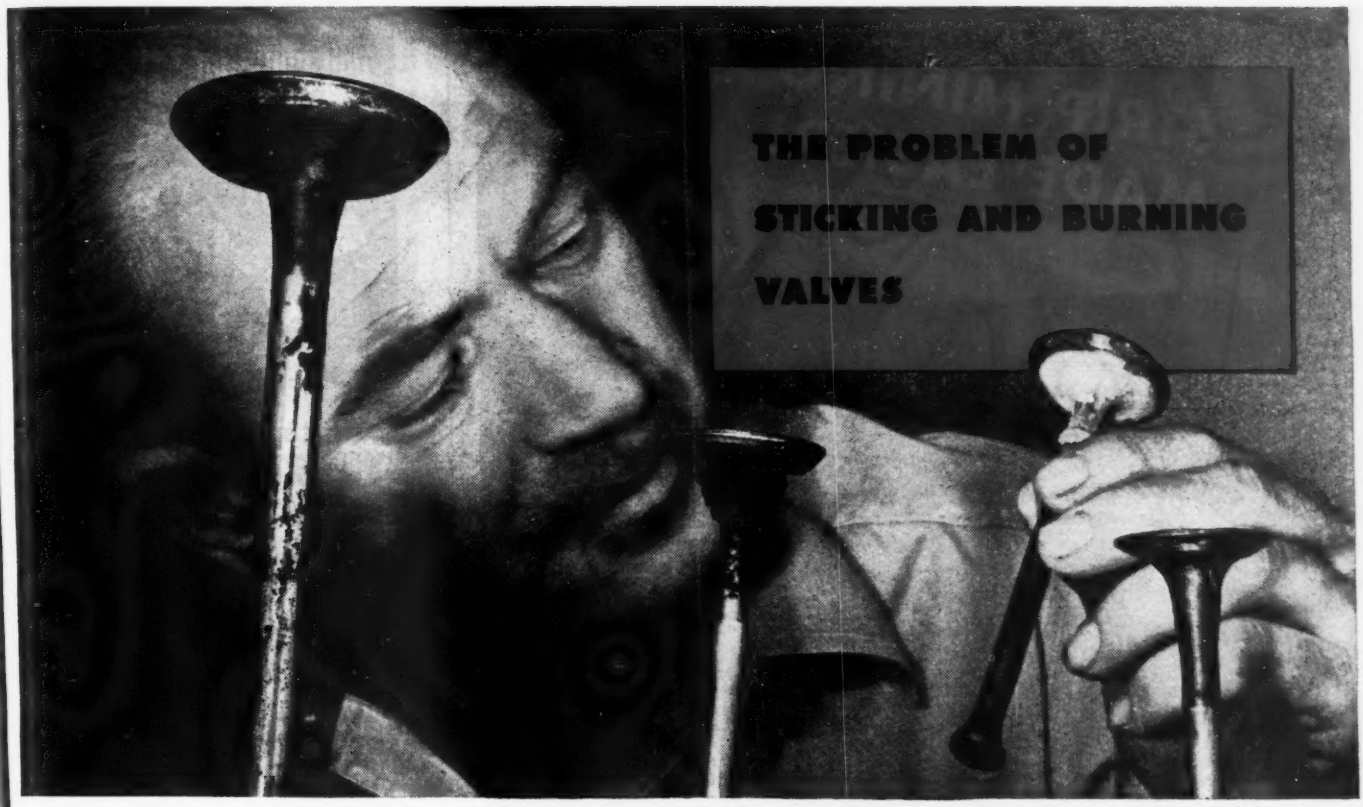
**Tuesday morning, R. H. Morris, vice president, Gauley Mountain Coal Co., Amsted, W. Va., and Ralph A. Sherman, supervisor of fuel department, Battelle Memorial Institute, Columbus, Ohio.**

**Tuesday afternoon, E. J. Kerr, fuel engineer, Island Creek Coal Co., Huntington, W. Va., and D. S. Frank, superintendent, Cabin Creek Refinery, Pure Oil Co., Cabin Creek, W. Va.**

**Monday luncheon: Presiding, A. W. Gauger, director, Mineral Industries Research, Pennsylvania State College; speaker: Roy Bird Cook, Charleston, W. Va.**

**Tuesday luncheon: Presiding, A. W. Thorson, chief of conservation division, Solid Fuels Administration, Washington, D. C.; speaker, R. G. Lazzelle, mining engineer, Island Creek Coal Co., and member of U. S. Coal Commission to Great Britain.**

**Banquet, Tuesday evening: Toastmaster, Harry G. Kennedy, labor commissioner, Kanawha Operators' Association; speaker, S. H. Haughton, director, Geological Survey, and chairman, Fuel Research Board, Union of South Africa.**




VALVE troubles result in excessive consumption of lubricating oil, rough running and stalling engines, hard starting. As a rule, most of these valve troubles are caused by mechanical difficulties, although some result from slow speed operation, permitting excessive deposits.

**CHIEF CAUSES OF VALVE FAILURE**

1. *Insufficient Tappet Clearance* . . . Correction lies in more frequent tappet inspection and accurate clearance adjustment.

2. *Valve Face or Seat off Center* . . . This trouble may result in heavy gum and coke deposits piling up on under side of valve head and forcing it off seat. Here correction lies in proper valve grinding, or replacement.

3. *Warped Valves* . . . Valves that are warped will apparently hang open at high speeds while clearing at idle. Reseating or replacement is only correction. Reducing abnormal temperatures will likely prevent repetition.




4. *Weak Springs* . . . Replace with springs meeting manufacturer's specifications for spring tension.

5. *Worn Valve Guides* . . . Guides become worn from dirt in air intake or oil resulting in coke or gum deposits that build up on valve stems because of excessive oil. This may be corrected by more frequent service of air cleaner or installing more efficient air cleaner; and replacement of worn guides.

6. *Deposits on Valve Seat* . . . This is the most frequent cause of leaky valves with consequent loss in power and fuel efficiency. Source of this trouble is usually heavy carbon or lead deposits in combustion chamber, very rarely from foreign matter within combustion chamber. Narrower valve seats and strong springs with more accurate grinding technique are remedies.

7. *High Temperature Exhaust* . . . Caused either by back pressure due to restricted exhaust system or poor carburetion or late timing. This condition results in warped valves and assists in building up varnish, lacquer, gum or deposits on valve stems, resulting in sticky and/or leaky valves. Cure is to clean out or replace muffler and tail pipe and improve combustion.

8. *Insufficient Cooling* . . . Caused by scale, rust or muddy deposits in water jackets; failure of water pump to deliver enough water; bad vanes in pump; slipping pump belt. In all cases cleansing or repairing of cooling system is called for.

**MAIN CAUSES OF STICKY INTAKE VALVES**

Intake valves rarely fail or burn because they are constantly cooled by incoming charge of air-fuel mixture. However, they do frequently stick, due to:

1. *Gum Content of Fuel too High* . . . Gum in fuel forms deposits around valve stem above guide and under valve head. To correct, change to fuel of proper specification.

2. *Worn Guides and Stems* . . . Since most of stem and guide wear is due to dirt and dust in air, remedy is more frequent service of air cleaner, or installation of larger capacity oil bath cleaner and, of course, replacement of worn guides and valves.

**RING-FREE MOTOR OIL HELPS REDUCE VALVE TROUBLE**

*Correction of valve trouble is obviously a mechanic's problem. However, motor oil that penetrates fast—gets down around valve stems, and guides—reduces friction, and thereby prolongs life of valve. Macmillan Ring-Free Motor Oil has this quality of fast penetration. Furthermore, it is refined to withstand high engine temperatures. Ring-Free acts as a preventive for valve sticking, saving fuel consumption and costly repair bills.*

**FREE BOOKLET**




Write today for copy of free pamphlet on "Sticky and Burned Valves—Causes and Preventions." Address—Macmillan Petroleum Corporation, Room 1003, 530 W. 6th Street, Los Angeles 14, Calif.

**MACMILLAN RING-FREE MOTOR OIL**

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## SCHRAMM COMPRESSORS GIVE A STEADY FLOW OF AIR AT THE RIGHT PRESSURE!

Here, on a West Virginia strip mining job, you find a Schramm Air Compressor, furnishing air for a rock drill to get the coal *easier* and *quicker!*

Getting all the air you need—easily—that's the beauty of a Schramm Compressor. It is constructed to withstand tough jobs . . . is lightweight, compact, easy to move anywhere on the job!

Features: 100% watercooled . . . mechanical intake valve operating from cam in perfect timing . . . larger discharge valve with lower lift adding to efficiency.

Are you using Schramm Air Compressors in your mines today? There are *so many* jobs Schramm could do for you . . . write today for these and other details in Bulletin CM-44.

**SCHRAMM INC.** THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA







is practiced. E. G. Bailey, vice president, Babcock & Wilcox Co., said that tramp iron can cause great damage and expense in a power plant. Calling attention to the fact that "poor people in the city" pay twice as much for lump coal as do the utilities for fines, which cost much more to prepare, he suggested that possibly less expense should be put into cleaning fines.

Byron F. Bird, concentration engineer, Jeffrey Mfg. Co., questioned whether, in the mining operations, the possibilities of reducing fines have been exhausted. He emphasized the importance of keeping oversize from getting into the cleaning equipment. W. T. Brown, consulting coal and coke engineer, Pittsburgh, said that better cleaning plants are a necessity for coals to be used in the steel industry.

Mr. Brown presented a highly technical paper on exhaustive research covering "Forms of Sulphur in Coal and Their Origin" with a large number of coal analyses. Regarding amorphous sulphur, he said there is no proof that it exists in coal and also no proof that it does not exist. Reducing sulphur in coal, he said, is one of the greatest problems of the steel industry today. New tests should be developed for the various forms of sulphur.

Practical effects of sulphur in utilization were discussed by A. W. Gauger, director of minerals research, Pennsylvania State College. For steam plants he has never been able to get figures on the added cost of plant operation, including maintenance, occasioned by a certain percentage increase in sulphur. He would like to learn if the steel industry will pay the price to get the sulphur out of high-sulphur coals when low-sulphur coals become scarce. Ash softening, he said, is a function of at least nine variables, and, so far, no detrimental effect in lowering ash fusion has been pinned on sulphur. On the whole subject of sulphur in coal, and especially regarding amorphous sulphur, he said almost any observation can be substantiated by some authority.

Gilbert H. Cady, chief geologist and head, Illinois State Geological Survey, said he believes it a fundamental error to regard peat-bog decay as an essential preliminary to coal formation, since only plant



# WE PUT THE MILKMAN ON OUR PAYROLL

EVERY DAY—at the fatigue point in each shift—every Thermoid employee is served a container of energizing milk. And the workers enjoy a relaxing "seventh inning stretch" as the containers are handed around at machine, bench and desk.

How did we come to put the milkman on our payroll?

One answer is found in the results of his visits . . . the noticeable improvement in the health of both plant and office workers . . . the steady decline in fatigue-born accidents . . . the equally steady, over-all rise in the quality of Thermoid production.

Another important reason, however, was the unique spirit of cooperation that governs all activities here at Thermoid. Long ago, we learned that the sides of the business triangle—the employer, the employee and the customer—are held together by common interests; and retarded functioning of one impairs the useful strength of all.

Thus, the idea of free milk each shift is neither paternalism nor soft persuasion in the minds of Thermoid workers; but is welcomed by them as a common sense way of meeting a mutual problem. And that is the spirit that makes our customers say: "It's Good Business To Do Business With Thermoid."

**Thermoid Rubber**

**DIVISION OF THERMOID COMPANY**
**TRENTON, NEW JERSEY**

*THE THERMOID LINE INCLUDES:* **TRANSMISSION BELTING • F.H.P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE • SHEET PACKINGS • INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • MOLDED HARD RUBBER AND PLASTIC PRODUCTS.**

IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID



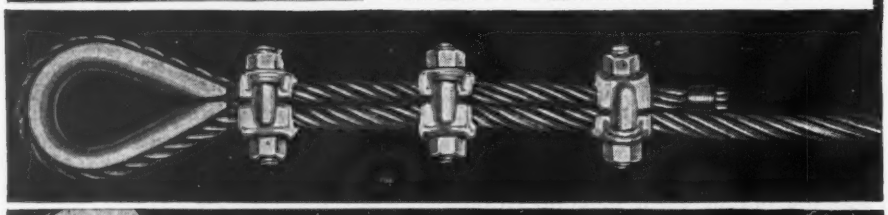


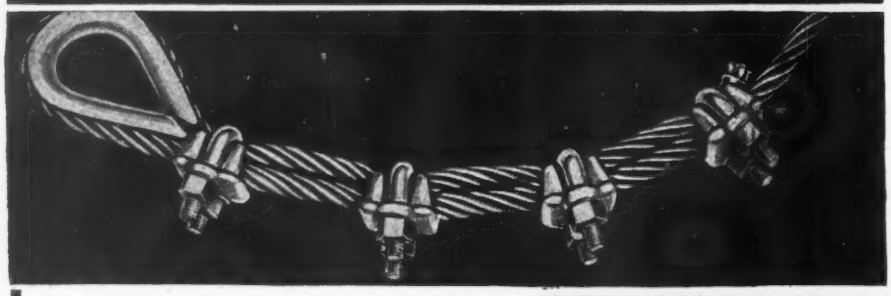
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SAVE TIME





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ORDINARY U-BOLTS

WASTE ROPE — WASTE CLIPS
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**Help Yourself and the War Effort by Using Laughlin "FIST-GRIP" Clips**

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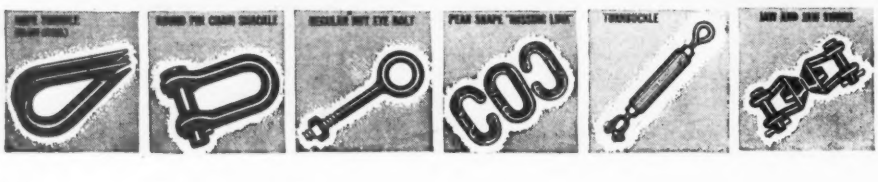
***Wire rope users***—if you haven't used Laughlin "Fist-Grip" Safety Clips to help you in this program . . . try them now. See how they save rope . . . and clips, time, and tools as well.

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**THE THOMAS LAUGHLIN Company**

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## COMING MEETINGS

- **American Society of Heating and Ventilating Engineers: 51st annual meeting, Jan. 22-24, Hotel Statler, Boston, Mass.**
- **American Institute of Mining and Metallurgical Engineers: annual meeting, Feb. 18-22, Pennsylvania Hotel, New York.**

material that has withstood biological decay is available for formation of coal. The short biological period before burial compared to the long geologic process period indicates other agencies than hydrogen sulphide produced from sulphur bacteria have been important in the production and redistribution of pyrite.

A 5-percent increase in the next five years in the consumption of coal (new industries not included) in the Kanawha Valley centering at Charleston, W. Va., was forecast from replies to a questionnaire sent out by T. W. Harris Jr., division purchasing agent, duPont, and chairman national committee on coal, National Association of Purchasing Agents. In his paper, "Industrial Coal Requirements of the Kanawha Valley," Mr. Harris placed the present annual industrial requirement of the valley at 4,500,000 tons of bituminous coal, including 500,000 tons produced by captive mines. Of the total, 700,000 tons is used for coking and other special processes and the remainder for steam. Normally all but 30,000 tons (from the Pocahontas field) was supplied from mines of the Kanawha Valley, but now some comes from the Coal River field and about 60,000 tons from Preston County.

Tonnage produced in the Kanawha Valley industrial neighborhood is now 25 percent lower than in 1941. The return of miners from the armed services and further conversion of mines to mechanical methods will more than offset the 5-percent increase in industrial demand predicted for the next five years. At present considerable coking and special-process coal is being consumed for steam purposes in the Valley. In his paper Mr. Harris included discussions and typical analyses of the following coals: Stockton-Lewiston, No. 5 Block, Winifrede, Dorothy, Coalburg, No. 2 Gas, Cedar Grove, Eagle and Powellton.

Veleair C. Smith, consulting engineer, Charleston, said he thinks the 5-percent estimate too low because of the stability of some of the new developments such as the plastics. He set 10 or 11 percent as the minimum industrial coal requirement increase (without new plants) for the next five years.

"Work of the National Fuel Efficiency Program," a paper by Thomas C. Cheasley, supervising engineer, National Fuel Efficiency Section, U. S. Bureau of Mines, outlined the fuel needs of the country and the organization for the program. One hundred seventy-five coordinators are carrying on the work in that number of industrial communities over the country.

*Every Man-Hour Counts*




# Why lubricate motors twice a week When TWICE A YEAR will do . . .

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Here's one way to save precious man-hours . . . and they *are* precious in view of the latest estimate by Coal Age that 37,000,000 more tons of coal will be produced this year—by 60,000 less men.

Keystone Ball Bearing End Bells installed on your motors save many man-hours by eliminating the necessity of weekly lubrication—and making *two lubrications a year* suffice.

Much of your motor expense results from sleeve bearings . . . from the wear that occurs in them, and from their continuous oil leakage. Here are troubles that Keystone End Bells check:

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2. On both A.C. and D.C. motors Keystone Bells, lubricated with grease, *retain their lubricant* and stop troubles due to oil and dust accumulating on coils, or constricting ventilation ducts.
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4. No need for frequent inspection, as required by sleeve bearings. And—as stated—less frequent lubrication.

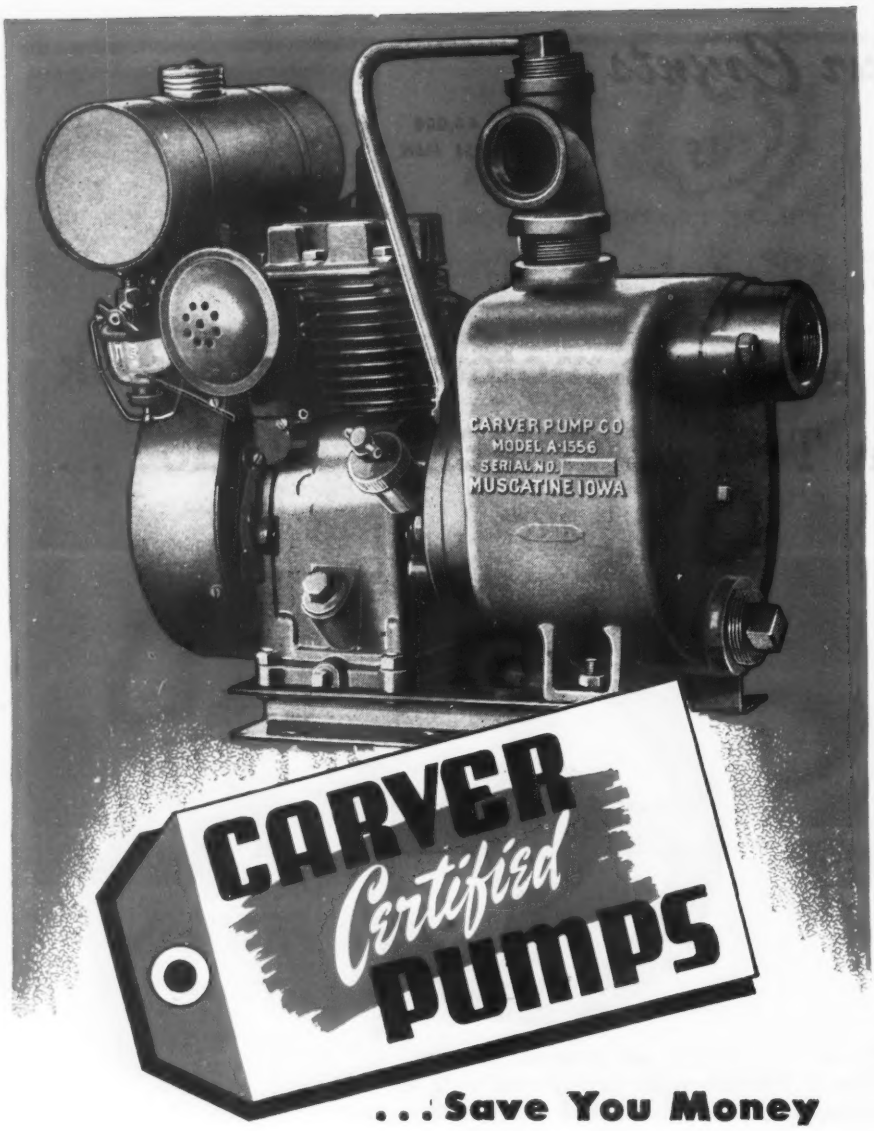
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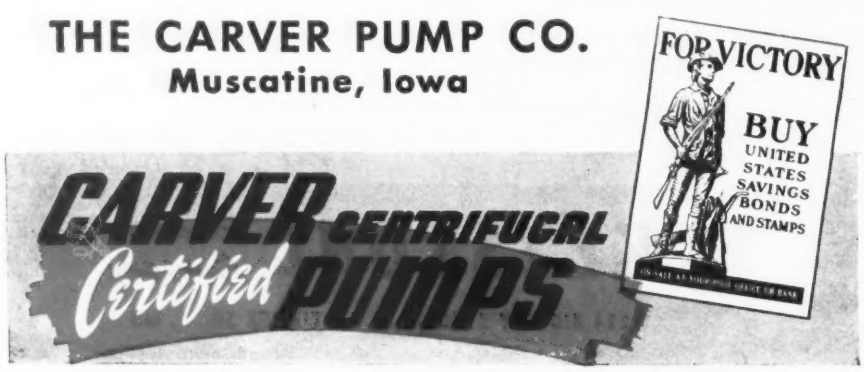



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Every Carver Pump carries a "Certified" tag which means that it has been carefully tested and fully meets our high standards for performance on the job. It's your assurance of peak performance on your toughest jobs as well as on the easy ones. For details, see your nearby Carver distributor or write direct.

**THE CARVER PUMP CO.**
**Muscatine, Iowa**




## Equipment Approvals

**Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in October, as follows:**

**Jeffrey Mfg. Co.—Type 56A drilling machine (redesigned); two motors, 13 and 3 hp., 500 volts, d.c.; Approval 520A; Oct. 9.**

**Joy Mfg. Co.—Type 32D9P shuttle car (storage-battery operated); three 5-hp. motors, 90 volts, d.c.; Approval 521; Oct. 20.**

Regional engineers working under the coordinators visit plants, sell the program to the management, obtain a compliance pledge and the appointment of a waste chaser who is furnished quiz sheets pertinent to his plants and which when filled out show the chances of improvement.

W. G. Christy, smoke abatement engineer, Hudson County (N. J.) Department of Smoke Regulation, Jersey City, member of the advisory council of the national program and also coordinator for the New Jersey industrial area, reported fine cooperation from the larger plants in his nine districts. Results in the smaller plants, usually short of engineering talent, are doubtful. Many plants that had to convert from oil to coal began reconversion to oil a month ago. Heating plants have been troublesome. No lists were available. Frequently a superintendent will not give the name of the owner of an apartment building, fearing that cooperation in the program might make more work for him. Incidentally, Mr. Christy mentioned that many apartments have fallen into the hands of wealthy refugees from Europe.

A detailed report on methods, work done and savings effected in the Detroit area was given by W. B. Hurley, staff engineer, Detroit Edison Co., and chairman of the coordinator advisory committee for that area under P. W. Thompson, coordinator, who also is vice president of the Detroit Edison Co.

Plants have made savings in fuel consumption averaging 2.6 percent. For the large consumers the average was below 1 percent but for the small consumers savings of 5 to 20 were common and some ran up to 50 percent. A screen and storm-window manufacturing company, by installing storm windows, insulating steam pipes and arranging to burn wood refuse, saved 60 percent, which meant 45 tons of coal per year. A recent falling off in the fuel-saving program was attributed to: (1) conflicting information regarding the fuel shortage, (2) feeling that the European war is near its end, (3) the easy savings jobs have been covered, and (4) regional engineers busier with other activities.

That coking, caking and matting has greater effect than any other characteristic of coal in burning over the tuyeres of an underfeed stoker was brought out in a paper, "Coal Facts, Coal Characteris-

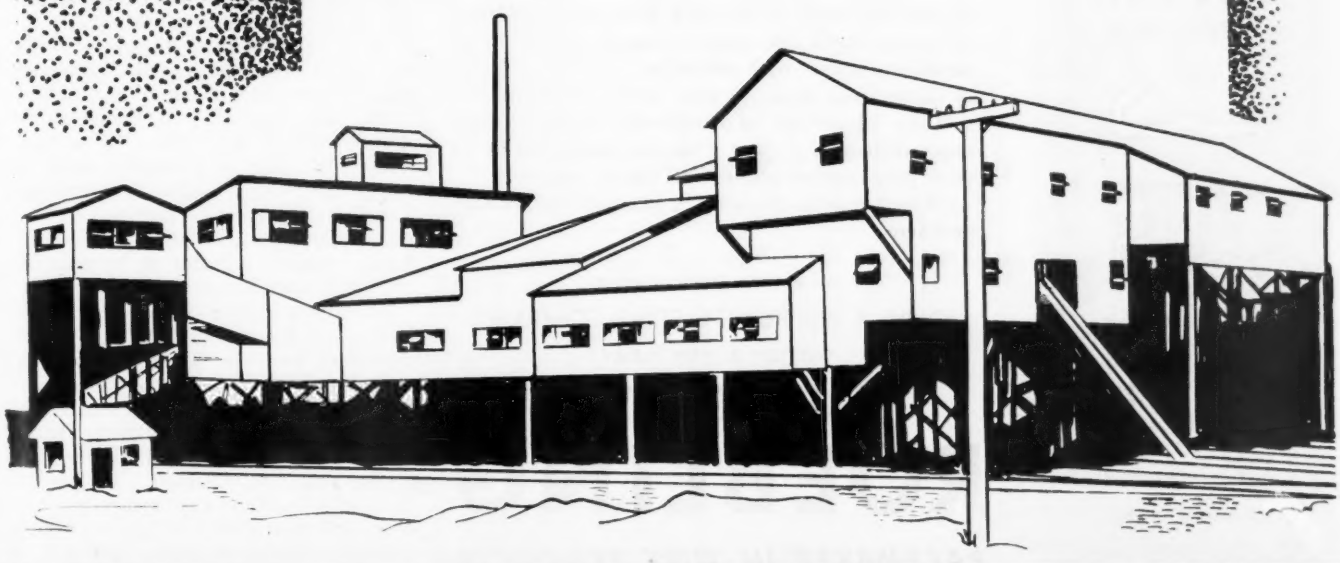
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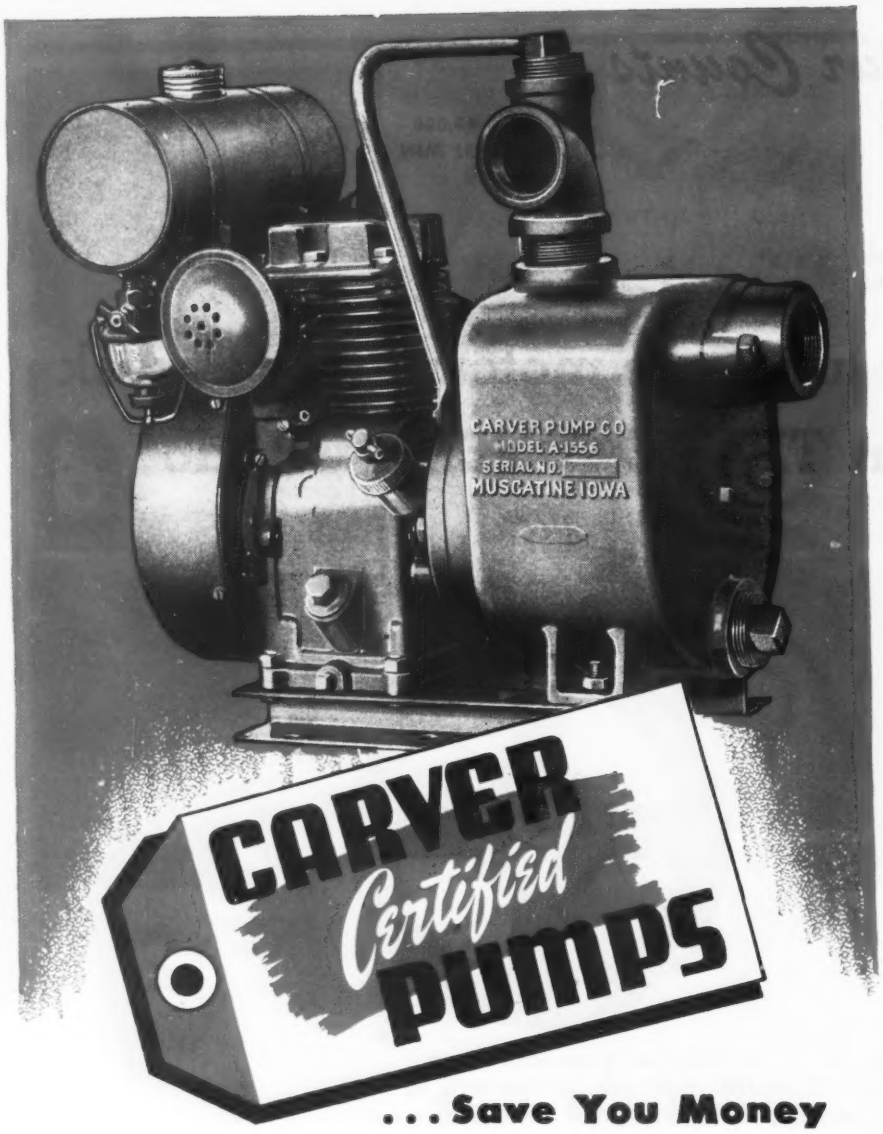
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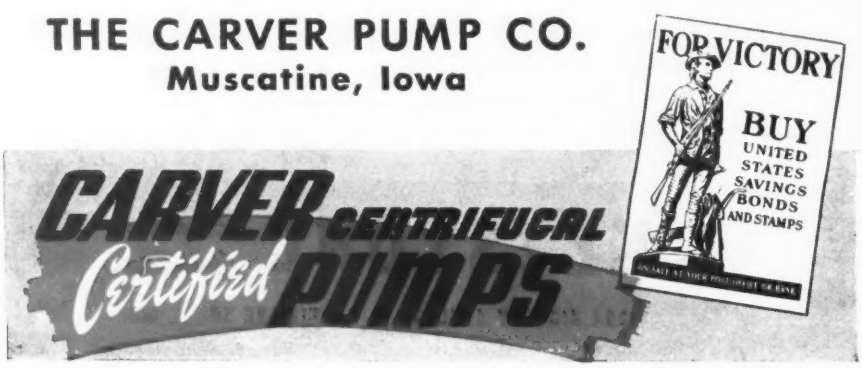



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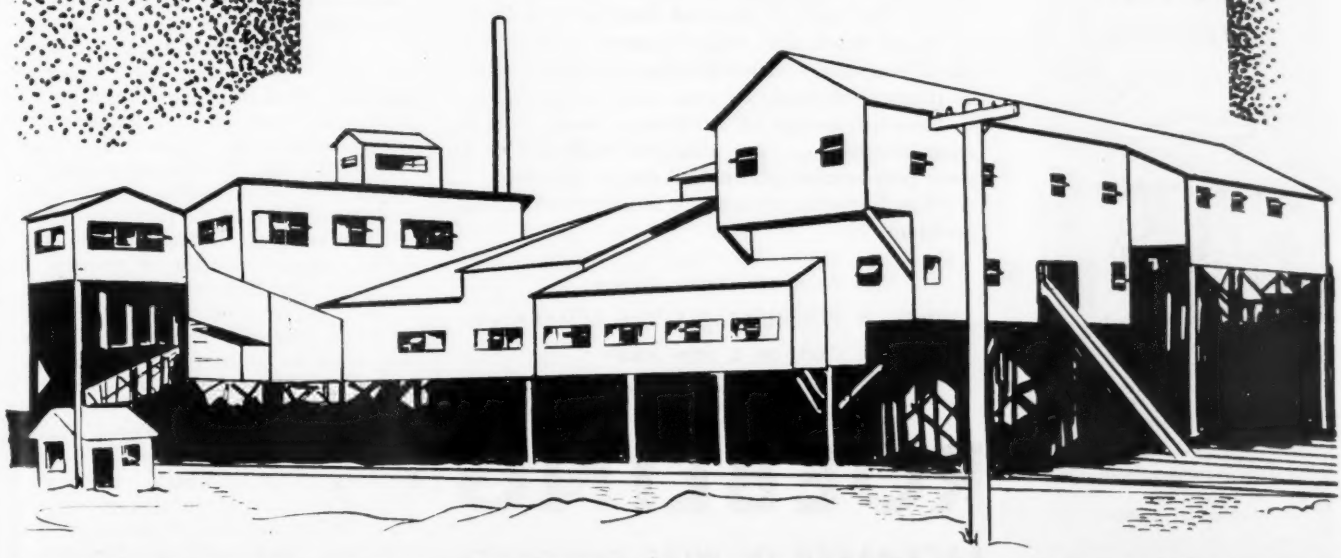
## TO MEET PREMIUM SPECIFICATIONS

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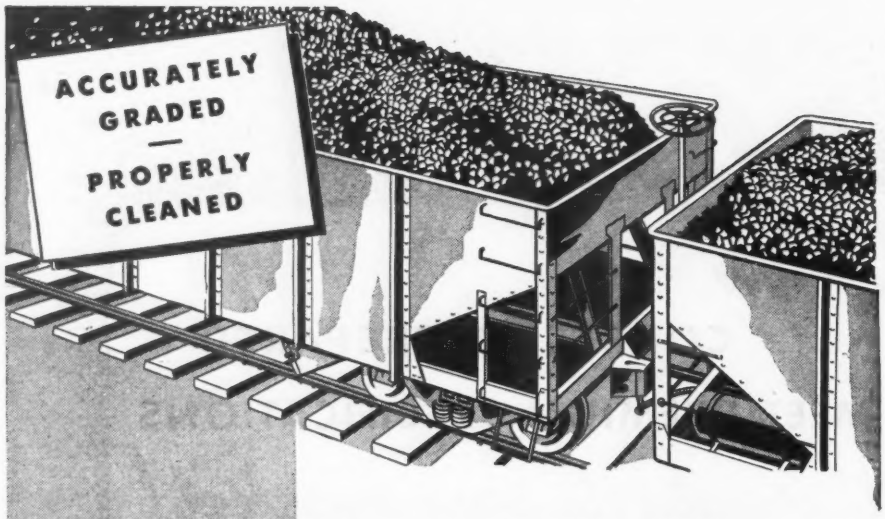
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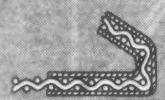
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tics and Imagineering With Underfeed Stoker Fuel Beds," by L. A. Shipman, fuel engineer, Southern Coal & Coke Co., Knoxville, Tenn. He reviewed the literature on the subject and gave his own observations on practical points dealing with combustion and stoker design.

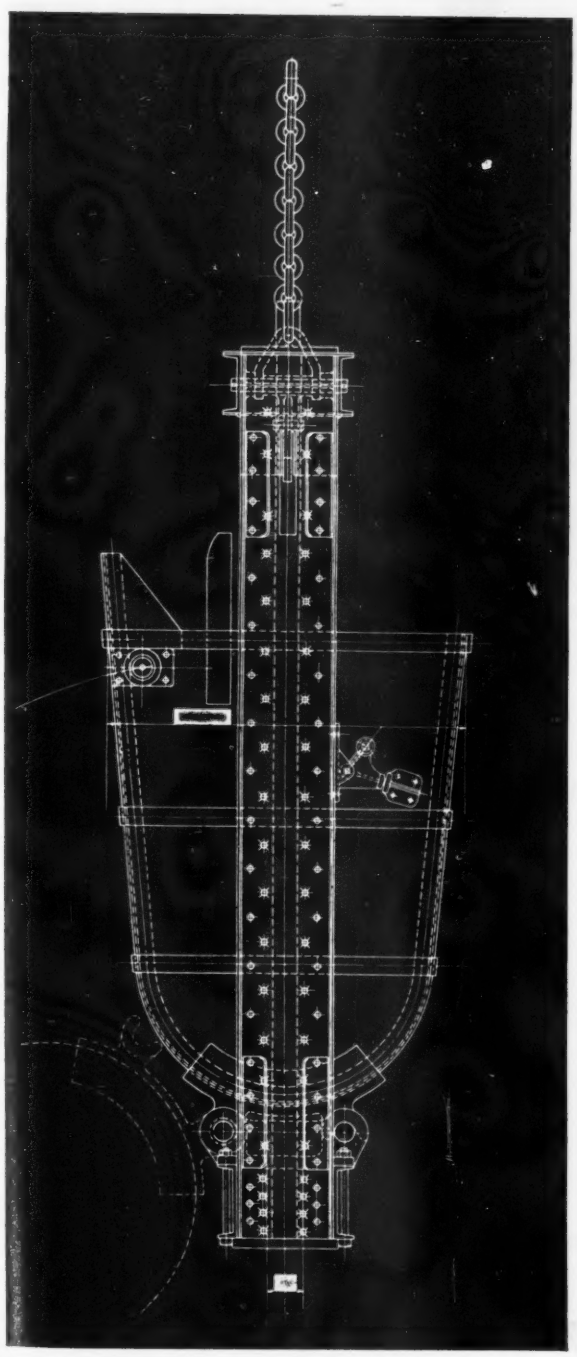
Mr. Shipman made the following differentiation between the terms coking, caking and matting: "All volatile coals when heated coke; coking is when the process results in relatively small pieces of coke; caking is where these pieces stick together and become fairly large lumps or chunks, and matting is where these chunks stick together with plastic coal until they blanket a fairly large portion of the fuel bed and restrict air flow." Any one of these can result when the same coal is processed under different conditions, thus in a retort the conditions between the time the coal reaches preplastic and plastic temperatures are highly important.

Calvert C. Wright, professor of fuel technology, School of Mineral Industries, Pennsylvania State College, said that his experiments with a single-retort stoker indicated that without change in the setting of a non-weighing feeding device there can be a feed-rate variation of 25 to 30 percent. Increasing the ash discharge on a matted fuel bed does not help the matting much, according to Carroll F. Hardy, Appalachian Coals, Inc.

Charles H. Sawyer, Koppers research engineer, said that a single operator, observing combustion action, is unable to see the same thing on two consecutive days. Commenting on the importance of Mr. Shipman's paper, J. E. Tobey, managing director, Fairmont Coal Bureau, said that in 1935 when a survey of 9,000 plants was made by Appalachian Coals, 48 percent of the tonnage they consumed was burned with underfeed stokers. Commenting on colored photographs in the study of combustion, Mr. Cady said there is need for other things to support the visual observations. Mr. Bailey emphasized the effect of rate of heating upon coke, cake, mat, etc. A fragile char is desired instead of a coke. If a fourth type of burning (a channel burning between two ragged walls) is recognized, something useful to the fuel engineer may be developed, according to Elmer F. Kaiser, assistant director of research, Bituminous Coal Research, Inc.

The spreader-type stoker is adaptable to the widest range of fuels but recognition must be given to fly-ash collection and disposal to prevent a nuisance in certain communities, it was stated in a paper, "Design of Small Power Plants," by H. C. Carroll, Commercial Testing & Engineering Co., Chicago. He showed slides of several new coal-storage and handling devices installed at plants in cities with little space available. Mr. Carroll gave as the main reason for electrical generation in manufacturing plants the fact that steam needed for heating and process work can be utilized first in power-generating units acting like reducing valves. Careful tests and investigation are required to determine heat balance before rebuilding a plant or deciding if power generation should be added. He discussed

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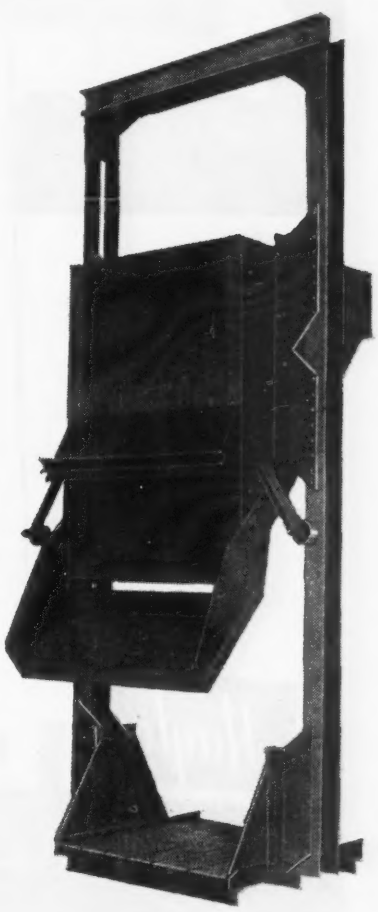
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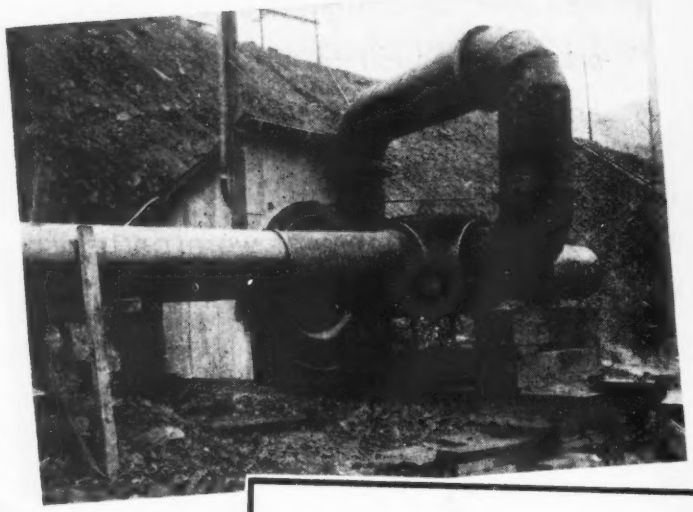
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two other types of stokers commonly used in small plants in the single-retort and the natural- and forced-draft chain grate.

H. D. Bowker, preparation manager, West Virginia Coal & Coke Corp., said his company is installing a 1,100-hp. boiler in addition to the two original 500-hp. boilers at the Omar generating plant. Mine water is used and requires both external and internal treatment. Maintenance is high on the steam-jet ash-disposal system, the principal difficulty lying in the rapid erosion of the 90-deg. turn in the discharge pipe. He recommended the manufacture of cinder concrete blocks as a good use of power-plant ash.

Mr. Tobey pinned the poor, overloaded and one-coal designs of many small plants on chiseler bidders whose low offers cause reputable bidders to scale down their first and more suitable designs. He said more plants go in wrong than right.

J. D. Clendenin, research assistant in fuel technology, Pennsylvania State College, showed slides from and read a summary of a 41-page paper, "Use of Anthracite Fines in Byproduct-Coke Production." Collaborators in preparing the paper were K. M. Barclay, also a research assistant, and Professor Wright. The investigation was jointly sponsored by the Anthracite Institute and the Commonwealth of Pennsylvania.

The work indicated that anthracites of high gravity and low volatile content are not necessarily more suitable for blending than anthracites of the opposite characteristics. The paper declared, however, that in practice recent reports show that the types of anthracite first mentioned are more suitable for blending in small quantities in making byproduct coke. In conclusion it was stated that for the blending, a No. 5 buckwheat should be selected having a size consist that will result in the strength and blocky characteristics wanted. J. D. Doherty, Koppers Coal Division, suggested that the rate of shrinkage of the anthracite as it is heated may have a bearing on the subject.

### Necessity for Blending

"Blending Coals Reflects Greater Uniformity of Product" was the title of a paper by R. F. Stilwell, fuel engineer. He covered the necessity of blending, value of uniform quality, size, appearance, methods and showed slides of several bin designs explaining the points regarding segregation and breakage. Included in his paper are tables of analyses showing the effects of blending certain coals.

A discussion written by E. C. Payne, consulting engineer, Consolidation Coal Co., New York City, and read by Mr. Kaiser, said that the value of cleaning and blending to the customer should be determined at a more normal time than the present and that the coal company should publicize the fact that the refinements in size and uniformity are expensive and ultimately must be paid for by the consumer. H. F. Hebley, director of research, Pittsburgh Coal Co., said that in all blending there is the bugaboo of segregation and that not nearly enough study has been devoted to prevention of segregation in bins. Locomotive coaling stations are notable for segregation. He noted that two or more manufacturers

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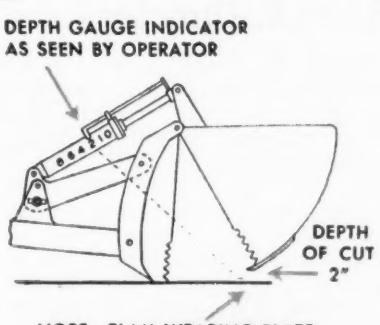
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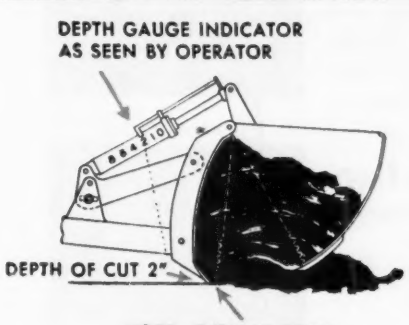
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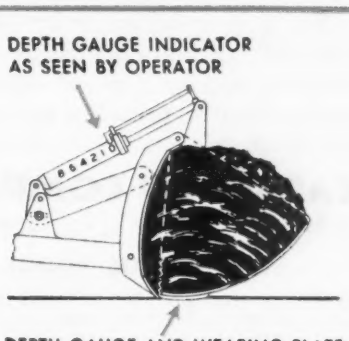
**Tough, versatile... there's no job too big or too small for the Drott Bull Clam Shovel. Takes on anything its jaws can grab or its bowl can hold! Use it to build roads, grub trees and stumps, dig up and move boulders... clean dirt from ore beds... pick up ore spillage from around pit, tipple, railroad tracks. Put it loading from stockpiles of coal, gravel, sand, cinders. Let it dig your drainage ditches... build and maintain your levees and dams. You can also use it to load trucks. Here is your bulldozer, scraper, grader—all in one unit! It will pay you to investigate. Get all the facts... NOW! Write for literature.**




NO. 1 STARTING LOAD




NO. 2 LOADING




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WRITE
**HI-WAY SERVICE CORPORATION**
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Announcing

REAMER SHELLS WITH SINTA-SET TRADEMARK INSERTS




(SIZE EX—3 INSERTS. SIZES AX, BX, NX—4 INSERTS)

With Special EXTRA-LIFE FEATURE!

We announce a complete line of Sinta-Set Reamer Shells stocked for immediate delivery. Same high quality as the now widely used Sinta-Set Core Bits, with highly selected West African Bort. Reamer can be re-sized with shims to provide extra life when loss of size occurs.

Available in sizes EX, AX, BX, NX, single or double; Longyear, Sprague and Henwood or Sullivan type shells. Fit standard core drill fittings as listed in U. S. Commercial Standard Bulletin No. CS-17-32. Sinta-Set Inserts also brazed in your special shells, or available unattached for your own brazing.

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SALES AGENTS

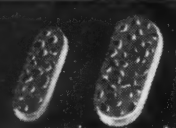
Sprague & Henwood, Inc. Scranton, Penna.
Caird Engineering Works Helena, Montana
E. J. Longyear Co. Minneapolis, Minn.
Int'l General Electric Co. Schenectady, New York
Christenson Diamond Products Co. Salt Lake City, Utah

STOCKED FOR IMMEDIATE DELIVERY

3 Types: Longyear, Sprague & Henwood, Sullivan. Sizes EX, AX, BX, NX—Single or double tube.

REASONABLY PRICED

| Size | Inserts | Single | Double |
|---|---|---|---|
| EX | 3 | $21.50 | $23.00 |
| AX | 4 | 27.00 | 28.75 |
| BX | 4 | 35.00 | 37.00 |
| NX | 4 | 39.50 | 42.00 |



Separate inserts also available.
Size 1/8 x 1/4 x 1/2 . . . $4.66 (For EX and AX)
Size 1/8 x 3/8 x 1/2 . . . $6.30 (For BX and NX)

SINTA-SET TRADEMARK
DIAMOND CORE BITS AND REAMER SHELLS


have designs aimed at preventing segregation in stoker hoppers.

L. A. Shipman pointed out that blending to increase value of a certain size—for instance, nut-and-slack—will not produce the same advantage on the other sizes. M. J. Williams, Pittsburgh Coal Co. (Wisconsin docks), said that segregation in stockpiles 40 to 50 ft. deep is bad unless bulldozers are used frequently to level them while they are being built up. Segregation after the coal leaves the preparation plant is a big problem, according to David R. Mitchell, professor of mining, Pennsylvania State College. He said that every time the product is moved segregation takes place. W. D. Langtry, president, Commercial Testing & Engineering Co., called attention to segregation in stockpiles as a principal cause of fires and mentioned that in Chicago blending is illegal.

In his 22-page paper, "The Missing Data on Coal Sampling," Bertrand A. Landry, assistant supervisor, Fuels Division, Battelle Memorial Institute, described exhaustive sampling investigations made on 15 coals. He proposes a new term, "measure of variability," which amounts to "standard deviation squared," and he gave formulas for calculations of this measure of variability. He proposed a program which "would eventually rid sampling of its unpleasant surprises and reduce sampling to a minimum." The basic information missing is that on consist, variability of ash of pieces, variability of ash of increments and collection of enough gross samples to give confirmation to the established relations between the variables involved.

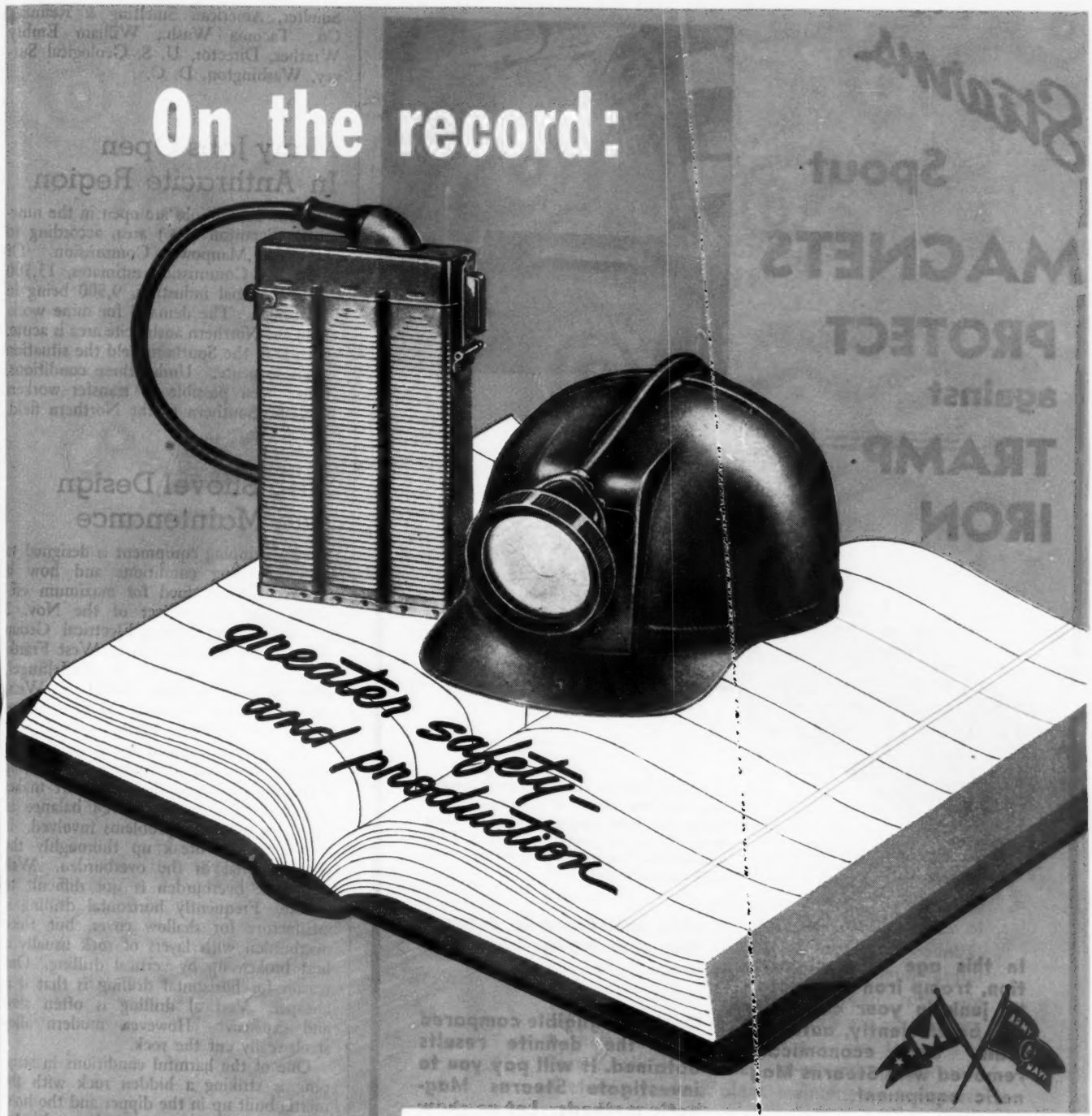
Mr. Davis does not see how the degree of mixing can be determined; therefore he expects that we must continue to take more increments than are actually required. Mr. Sawyer said he thinks the aims of Mr. Landry's paper not far from fruition and that there is needed only experience data to check Mr. Landry's findings.

•

## R. H. Morris Named A.I.M.E. Director

Robert H. Morris, general manager, Gauley Mountain Coal Co., Ansted, W. Va., has been elected a director of the American Institute of Mining and Metallurgical Engineers, the election being by letter ballot cast by Nov. 16. Others elected include: president and director—Harvey Seeley Mudd, president and managing director, Cyprus Mines Corp., Los Angeles; vice presidents and directors—Donald H. McLaughlin, vice president and general manager, Cerro de Pasco Copper Corp., New York City, and Leo F. Reinartz, manager, Middletown Division, American Rolling Mill Co., Middletown, Ohio; directors—C. H. Benedict, metallurgical manager, Calumet & Hecla Consolidated Copper Co., Lake Linden, Mich.; J. C. Nicholls, assistant to president, International Nickel Co. of Canada, Ltd., Toronto; Clyde E. Weed, vice president in charge of mining operations, Anaconda Copper Mining Co., New York City; Eugene A. White, manager, Tacoma

# On the record:




**EDISON** ELECTRIC CAP LAMPS

**M. S. A.** SKULLGARDS

The safety of better lights provided by the Edison Electric Cap Lamp and the greater head protection of the M.S.A. Skullgard are serving men in mines of every type and size . . . the higher production at lower costs aided by this modern equipment are proved in the books of mining companies throughout the world. May we arrange a demonstration in your own operations?

**MINE SAFETY APPLIANCES COMPANY**

BRADDOCK, THOMAS AND MEADE STREETS · PITTSBURGH, PENNA.

*District Representatives in Principal Cities*

Stearns

Spout

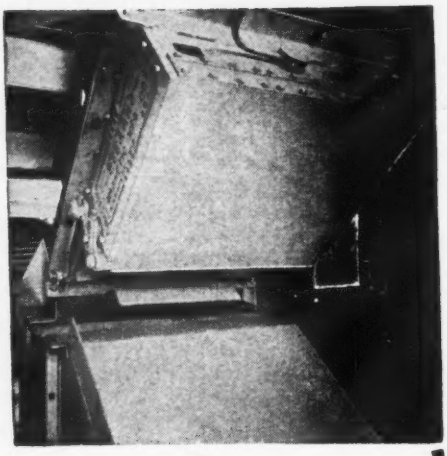
MAGNETS

PROTECT

against

TRAMP

IRON





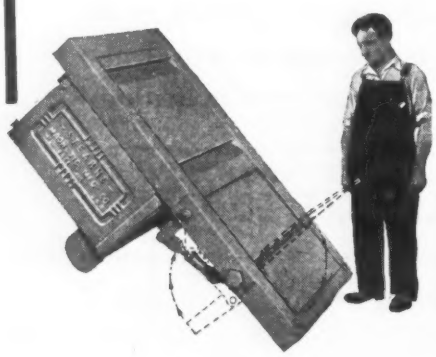
A typical Stearns Spout Magnet installation and the resulting accumulation of tramp iron from several days' operation. And—the scrap metal recovered helps substantially toward paying for the magnetic equipment.

**In this age of mechanization, tramp iron and metallic junk in your coal flow can be efficiently, automatically and economically removed with Stearns Magnetic equipment.**

**Our many years of pioneering experience in designing magnetic equipment for the coal industry enables us to be of profitable assistance in controlling your tramp iron problem.**

**Cost is negligible compared with the definite results obtained. It will pay you to investigate Stearns Magnetic methods. Let us show you how Stearns magnets can be put to work for you.**

**Write for Bulletin 97 on Stearns Spout Magnets; Bulletin 302, Stearns Magnetic Pulleys; Bulletin 25, Suspended Magnets.**



**Stearns Engineers are well qualified to advise you.**

**Ask for our recommendations. No obligations.**

**STEARNS MAGNETIC MANUFACTURING CO.**

**661 S. 28th St., Milwaukee 4, Wis.**


Smelter, American Smelting & Refining Co., Tacoma Wash.; William Embry Wrather, Director, U. S. Geological Survey, Washington, D. C.

•

## Many Jobs Open In Anthracite Region

About 20,000 jobs are open in the nine-county Scranton (Pa.) area, according to the War Manpower Commission. Of these, the Commission estimates, 13,500 are in essential industries, 9,500 being in coal mines. The demand for mine workers in the Northern anthracite area is acute, whereas in the Southern field the situation is not so acute. Under these conditions, it has been possible to transfer workers from the Southern to the Northern field.

•

## Strip Shovel Design And Maintenance

How stripping equipment is designed to meet operating conditions and how it should be maintained for maximum efficiency was the subject of the Nov. 2 meeting of the Mining-Electrical Group of Southern Illinois, held at West Frankfort. Speakers were G. B. Heffelfinger, assistant chief engineer, and J. F. Weis, chief electrical engineer, Marion Steam Shovel Co., Marion, Ohio.

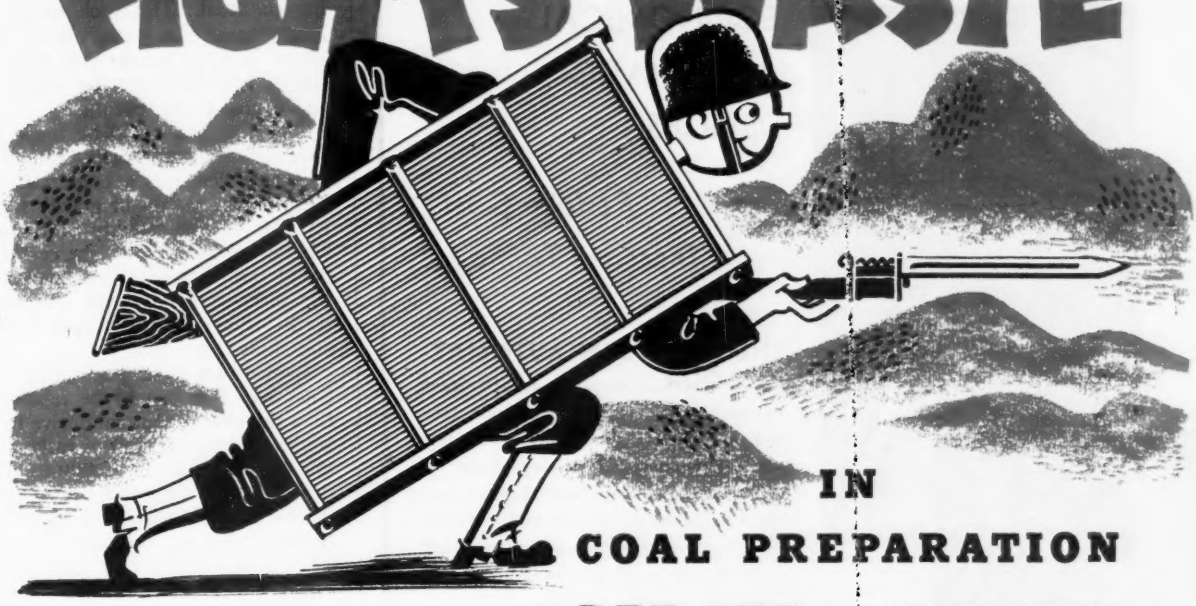
The problems faced by stripping machinery are most difficult. The varying overburden of rock, shale and dirt makes it difficult to secure an even balance in design to meet the problems involved. It is essential to break up thoroughly the hard material in the overburden. Well shot rock overburden is not difficult to handle. Frequently horizontal drilling is satisfactory for shallow cover, but thick overburden with layers of rock usually is best broken up by vertical drilling. One reason for horizontal drilling is that it is cheaper. Vertical drilling is often slow and expensive. Howevea, modern alloy steels really cut the rock.

One of the harmful conditions in stripping is striking a hidden rock with the inertia built up in the dipper and the hoist when moving along at good speed. Another problem is the tendency of the mine operator to order a larger dipper than his neighbor has—largely to satisfy his pride. The dipper should fit the job. The largest dipper does not always move the most material.

A trained shovel runner is the answer to many operating problems. Men on the various shifts who do not agree how a pit should be worked often slow down operations by taking time to adjust the pit to their fancy before getting down to work. There must be a right way to work a pit. Shovel runners should be trained to see that way and encouraged to cooperate to that end.

Pit haulage methods may interfere with getting the most from a stripping shovel. If the set-up is such that trucks must pass by and under the stripping shovel, a lot of time is lost by the shovel in accommodating it to truck movement. Time out

# FIGHTS WASTE

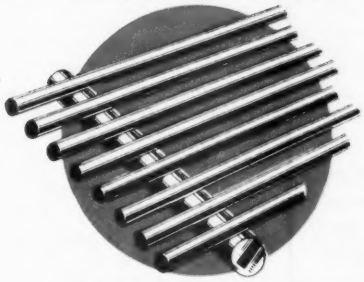


IN

COAL PREPARATION

...“BEE-ZEE” SCREENS

## 7 Standout Features of “BEE-ZEE” Screens



1. Accurate openings maintained because sides of rods get negligible wear.
2. Abrasion occurs only on top of rod, eliminating wear at opening.
3. High abrasive resisting alloys can be used because there is no deformation of bars in fabrication.
4. Opening remains continuous over supporting rods, avoiding blind spots and clogging.
5. “Bee-Zee” Screens are rugged, all-welded construction, each rod rigidly welded in place.
6. Long, heavy-duty tie-rods provide ample support; contribute to long life.
7. Sturdy frames are part of screen, custom-built to fit all types of equipment.

“Bee-Zee” Screens stop waste in coal preparation because of their revolutionary round-rod design. In dewatering, sizing and drying operations, these screens are making outstanding records for long life and low cost at scores of preparation plants throughout the country. Round-rod construction assures maximum useful life. Accurate openings between rods are maintained even though the rods are worn down to half their original size. This feature of “Bee-Zee” Round-rod construction increases efficiency, lowers plant maintenance expense, assures more continuous operation. “Bee-Zee” Screens are manufactured for all types of coal preparation plant equipment. Call on our engineering service to help you efficiently equip your plant.

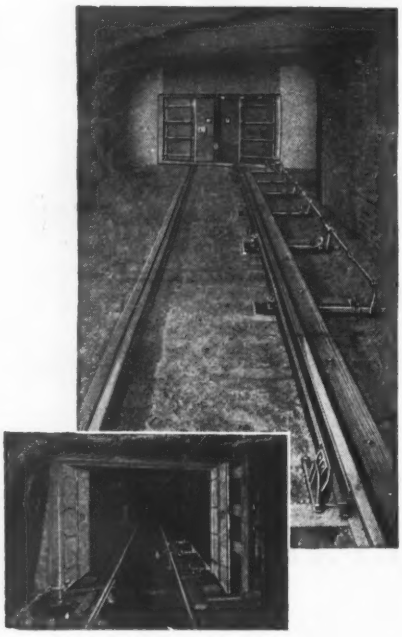
BEE ZEE

PROVED LONG LIFE IN LEADING COAL PLANTS EVERYWHERE

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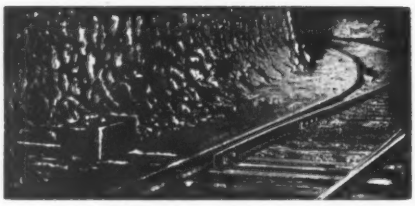
# SAVES LIVES, TIME and MONEY
## Speed the Haulage Safely with



ECONOMICAL
AUTOMATIC
DEVICES . . .

*Reduce Costs,*
*Increase Tonnage!*

**THE AMERICAN AUTOMATIC DOOR** . . . requires no attendant —opens automatically in a split second and closes same way when last car has passed—no slowing down on approach—thus trips are speeded up. Mechanical action is fast and positive. Air flow is maintained at constant speed to carry off accumulated gas.



**THE CANTON AUTOMATIC SWITCH THROWER**

. . . does everything a switchman can do and does it faster with safety. Automatically throws switch points ahead or behind trip—or both. Trip maintains full speed. Switch can be operated by motorman, remote control or by hand and is adapted for use with automatic DERAILER.



**SIGNALS** . . . warn interfering trips and clear the way for non-stop main line trips. Prevent collisions and enable all trips to move with safety and speed.

These automatic devices make for perfect coordination of loading, transportation and tipple by eliminating lost time and speeding trips efficiently and safely. Our sales engineers will be glad to inspect and recommend installations that will save man hours, improve *safety*—no obligations. Canton devices pay for themselves—quickly. Complete catalogues on request.

**AMERICAN MINE DOOR CO.**

**2057 DEUBER AVE., CANTON 6, OHIO**


for a big stripper may cost $300 to $500 an hour—$5 to $8 a minute. This is true for shovel breakdowns or any other interference with shovel operation.

There are no set rules for designing a shovel. All the assumptions are based on practice and conditions in the field. Some coals will carry a load of 50 lb. per square inch while the load on others must be reduced to 35 or 40 lb. to keep from breaking the coal. The stick could be made longer to give an extra lift or reach in a pinch, but the runner will take the extra length as a license to use it all the time and overload the machine.

The rear end could be made long and thus require less balancing weight, but pit clearance demands a conservative length. Keeping the center of gravity within limits adds to the stability of the machine. Marion design lays out the center of gravity of the machine at not more than half the distance from center pin to circular track—this with the dipper fully loaded and fully extended.

Crown and hoist gear ratios should be balanced. For one to be relatively faster than the other is not conducive to efficient work. The elastic limit of early alloy steels ran around 35,000 or 40,000 lb. per square inch. Present-day alloy steels run from 95,000 to 150,000 and make possible building stronger machines of less weight. This is responsible for increased dipper capacity with reduced dipper weight.

Very important is the $WR^2$ of the rotating parts. The loaded dipper alone accounts for 35 or 40 percent of the total. That is one place where high-tensile steels have helped shovel design. The knee-action front end, now applied to both loading and stripping shovels, permits approximately 20 percent larger dipper loading with the same $WR^2$. This advantage is secured by shifting the crowd mechanism from the boom back to the gantry, thus reducing the weight of the boom members and dipper stick. When applied to the loading shovel, the knee-action front end also has the advantage of a long, straight-line loading sweep that is helpful in effecting clean separation of coal from clay and promoting fast loading.

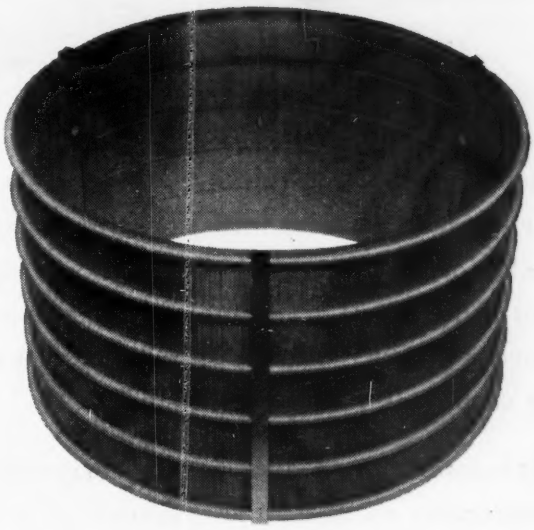
Many advances in the design of shovels have come through suggestions from the field. These are all considered when the design of a new shovel is up for consideration.

Frequent inspection, lubrication and cleanliness are essential factors in shovel maintenance. Cleanliness can scarcely be overdone. When a machine is covered with grime, trouble starts before it is discovered. Moreover, men don't like to work on a dirty machine.

"One shot" and similar gadgets and lazy man's methods of lubrications were decried by Mr. Heffelfinger. The oiler is on the job and he should do it. This method also provides continuous inspection, which may head off many accidents and delays. The various greases used to lubricate heavy mechanical parts and the more delicate electrical bearings should be applied by different grease guns. Even the nozzles and fittings should be different so that it is impossible to apply the wrong lubricant. Many shovels are ordered equipped with special grease fittings on the various types

# Wedge Wire Screens

## To Fit Your Own *Individual Coal Preparation Needs*



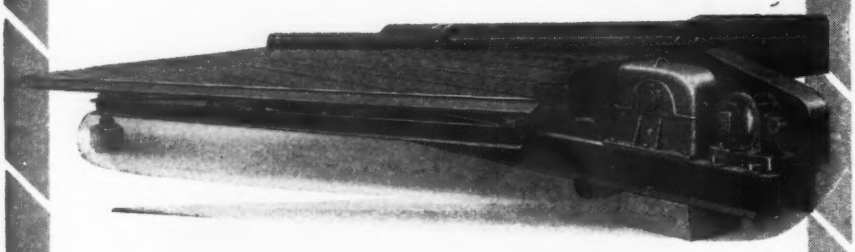
Whatever your screening problems may be, there is a Wedge Wire Screen custom-built to economically fit your needs. Wedge Wire, formerly manufactured in England, is now American-owned and American-made at our plant in Cleveland. This screen is built in a variety of materials--brass, bronze, aluminum, copper and stainless steel, depending upon the type of service. The shape of screen will also vary in accordance with the use and type of plant in which it is installed. The downward enlarging openings formed by the triangles eliminate clogging in Wedge Wire design. Our engineers can give you full information and specifications on Wedge Wire Screens. Write today.

MANUFACTURERS OF PREPARATION SCREENS . . . . . .

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# *Increase Coal Recovery–Cut Production Costs With* SuperDuty



Your every day recoveries of marketable coal show a sharp increase with SuperDuty Diagonal Deck Coal Washing Tables. Facts and figures kept by hundreds of leading coal mine operators prove SuperDuty's superiority under actual working conditions.

*The reason?* SuperDuty's exclusive diagonal deck construction combines the operation of a more efficient separation area with low power requirement—substantially 1 H.P. under continuous operation.

These profits are multiplied by the extra years of service built into SuperDuty by 38 years of engineering "Know-How" plus quality material and carefully balanced construction.

*The result?* With SuperDuty you get maximum recoveries at minimum cost.

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CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company • Inc. 1906*


of bearings to insure the right lubricant in each bearing. A schedule for lubrication should be adopted and followed.

Ball and roller bearings came in for special consideration. The need to keep replacement bearings scrupulously clean right up to the moment of installation and use of the correct lubricant are fundamental. A bit of dirt may ruin a bearing in a week. Overlubrication is blamed for many ball bearing failures, since that causes them to run hot. Large high-speed ball bearings, such as are used on 1,800-r.p.m. m.g. sets, require particular attention to absolute alignment and correct lubricant—possibly an oil instead of a grease.

The practice of heating ball bearings in hot oil before putting on the shaft is commended. It makes the job easier. The oil should be kept below the boiling point—around 200 deg. F. Attention was called to the practice of some manufacturers in sending out bearings of odd tolerances; say, a couple of thousandths under size. Such a bearing, when put on the shaft, is preloaded and its life shortened. Tolerance practice of the manufacturer should be checked before purchase to assure bearings of correct tolerances.

A point frequently overlooked is the need to lubricate flexible couplings between electrical and mechanical equipment. Mr. Weis pointed out that "coupling failure due to lack of lubrication is a frequent occurrence."

A really important operating kink is to rotate the shovel completely at the beginning of each shift. This brings a new set of rollers into action and extends both roller and rail life.

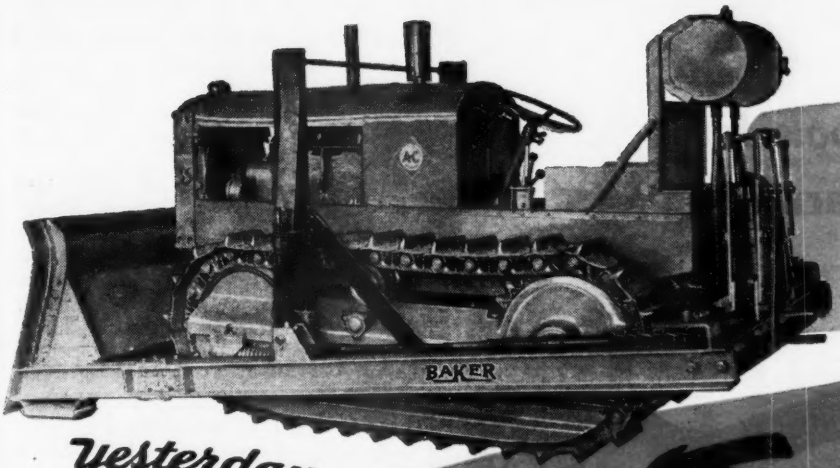
It is important to do all extensive overhaul and repair jobs in the summer season, when work usually is slack and weather conditions are favorable for doing a good repair job with safety to men.

Attention was called to the increased use of the dragline in its own right and as an aid to the stripping shovel in deep overburden. A much larger use of such equipment is predicted, as well as the manufacture of much larger machines than the present 25-cu.yd. monsters; perhaps up to 35 or 40 cu.yd., with 180- to 200-ft. booms.

Discussing the electrical equipment for large shovels, Mr. Weis stated that steam shovels are practically out of the picture for his company except for current orders from the Russian Government. Diesel-electric shovels are available in sizes up to 3 cu.yd. Now that large engine units with speeds up to 2,200 r.p.m. are available, large shovel units of that type are being considered—probably with engine speeds of around 1,500 r.p.m.

Compared to present day Ward Leonard electrical equipment controlled by the modern Amplidyne or Rototrol, the early applications of series motors with rheostatic, drum or contactor control were very crude. The Ward Leonard system makes big shovels possible. The use of slipring motors in the interim between rheostatic and Ward Leonard control was not very successful. Although the Amplidyne is being used in shovels down to 5 or 6 cu.yd., it is too soon to be positive about it.

Tube operation is being considered.







*Yesterday*

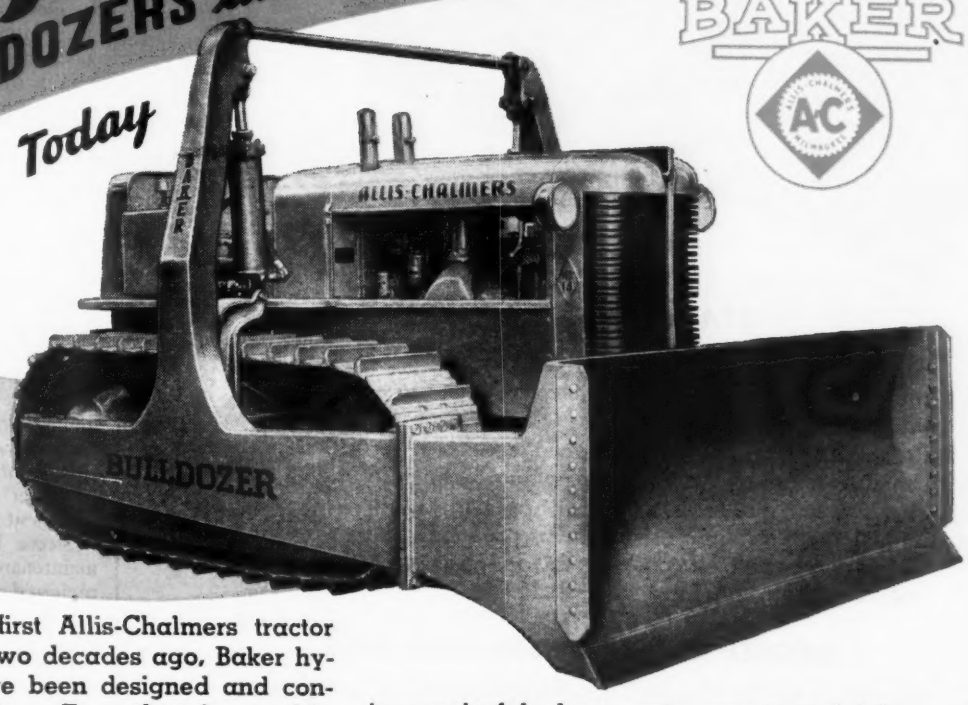
*"like salt and pepper"*

# They Go Together!

## BAKER BULLDOZERS and ALLIS-CHALMERS TRACTORS

*Today*

BAKER






Ever since the first Allis-Chalmers tractor was built over two decades ago, Baker hydraulic bulldozers have been designed and constructed for use with them. From that day to this, there has always been a Baker for every model Allis-Chalmers crawler tractor. Bakers are not adapted to—*they're built specifically for*—Allis-Chalmers tractors. Like salt and pepper, bacon and eggs, or bread and butter—*they go together!*

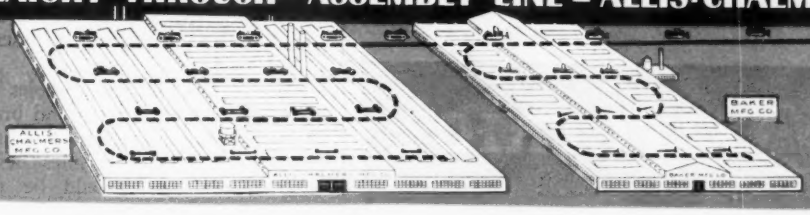
Baker engineering has kept pace with the progressive improvement of Allis-Chalmers tractors until today the modern Baker bulldozer is the ultimate in serviceful, low cost, easy-to-maintain earth moving equipment. Now, as always, there is a Baker bulldozer and gradebuilder for every model of Allis-Chalmers crawler tractor — described in Bulletin 839. Bakers are sold exclusively by Allis-Chalmers tractor dealers *everywhere.*

**THE BAKER MFG. CO.**

**514 Stanford Ave. Springfield, Ill.**

*If it Concerns Victory, it concerns us!*

## "STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!




The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.



## What to Look for When Selecting Varnished Cloth

### STARCH VS. VARNISH

The first thing to look for when selecting a varnished cloth is the degree of sizing. The more starch used in the sizing process, the less varnish there will be in the finished product — and it's the varnish that insulates, not the starch. G-E varnished cloth contains minimum sizing and maximum varnish impregnation. Heavy sizing produces a "slick" appearing cloth — one that looks "nice". Minimum sizing helps produce a cloth with high dielectric strength, low power factor, resistance to moisture, excellent heat aging and long shelf life.

### DEGREE OF VARNISH HARDNESS

Next consider the varnish—particularly its degree of hardness. The ideal varnish must be soft enough to retain maximum flexibility and to delay stiffening; yet hard enough to withstand abrasion where it may be encountered.

*For additional details consult your local G-E Distributor or write: Section M1241-10, Resin and Insulation Materials Division, General Electric Company, Schenectady 5, N. Y.*

**BUY WAR BONDS AND KEEP THEM**

Hear the General Electric radio programs: "The G-E All Girl Orchestra" Sunday 10 p.m. EWT, NBC. "The World Today" news every weekday 6:45 p.m. EWT, CBS.

**GENERAL ELECTRIC**


Something akin to the rectifier may be used to convert a.c. power on the shovel to d.c. for the motors. Among the questions to be solved to make that proposed application are space, shock and load conditions.

Motor-generator sets of 1,800 r.p.m. are attractive because they are cheaper, smaller and respond faster than the previous standard 1,200 r.p.m. sets. They are being used where practicable in spite of occasional trouble with ball bearings. Where the balance is perfect, to eliminate vibration, where alignment is exact and where light grease or suitable oil is used to lubricate, ball bearings on high-speed sets are likely to be satisfactory.

Because of space considerations, the new 35-cu.yd. shovel of the Hanna Coal Co. uses two 1,800-r.p.m. m.g. sets operating together. So far they are satisfactory. The starting equipment is arranged so that the second set automatically comes on the line after the first set is running.

Blowers added to the d.c. motors on large shovels increase the rating 25 percent. One of the chief advantages of blowers is that they permit the use of a smaller motor with a smaller diameter armature and a lower $WR^2$. This is a big advantage for motors in reversing service.

Ten to 13,000 lb. bail pull per yard of dipper capacity will load the hoist motors up to 200 or 250 percent in stalled condition. While motors are built to take such overloads in normal operation, the runner must not stall for any considerable time. Heating, under such conditions, runs to four or six times normal, and must not continue.

Mill-type motors are made to take overspeed and overvoltage temporarily. For example, an 187½-hp. hoist motor with a normal speed rating of 500 or 600 r.p.m. may make 1,400 r.p.m. when lowering the dipper, and a 230-volt motor is wound to stand a limit of 650 volts. Specially wound armatures designed to eliminate flash-over are available for certain hoist motors at higher than standard cost.

Sleeve bearings generally require more maintenance than ball bearings. They are preferred sometimes because repairs often can be made on the job—something not possible with a ball bearing.

Lack of power to handle peak loads has hit hard. That situation is being remedied by the power companies. On the score of electrical maintenance, scheduled inspection and periodic cleaning will cut the cost. Whether conditions require cleaning each shift, daily or weekly, a fixed schedule should be followed. Regular checking of electrical adjustments to maintain the standards of the manufacturers' ratings will do much to maintain maximum capacity and satisfactory performance. There is a tendency to boost the power of electric shovels by tampering with the limit settings, increasing the load on the equipment to more than normal. It is suggested that a general check be made before attempting to increase the power load.

One of the common troubles with d.c. machines is commutation and brush wear. With constant inspection and prompt replacement of worn brushes before they wear short, there should be no brush



The above view shows part of a 1450 foot long belt conveyor, which has handled over 6,000,000 tons of run-of-mine coal at a southern mine. S-A Simplex Carriers on this job have required a minimum of maintenance attention over a period of 11 years.

# *Over* 6,000,000 TONS

## WITH NEXT TO NO ATTENTION

### 1450 Foot Belt Conveyor Proves Lasting Value of S-A Engineering

The remarkable record for long, maintenance-free service hung up by Stephens-Adamson handling systems are partly the result of rugged construction and use of the finest quality materials.

But equally important is the fact that such systems are basically correct in original design — that's 'way back, when systems were in the planning stages, S-A engineers were able to utilize the exact type of equipment the job demanded.

This was made possible by the fact that S-A manufactures all types of belt and bucket conveyors, and elevators—plus all needed accessories, crushers, screens, feeders, transmission machinery, etc.

To get an unbiased recommendation on ways of handling coal more rapidly and lower costs, consult S-A. Write us today.

**STEPHENS-ADAMSON MFG. CO.**

2 RIDGEWAY AVENUE, AURORA, ILLINOIS — LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

*Designers and Manufacturers of All Types of*

**BULK MATERIAL HANDLING EQUIPMENT**

A SIGNIFICANT RECORD

*Bituminous Casualty Corporation*

- pioneered the writing of Workmen's Compensation insurance for coal mines.
- has a background of 27 years experience in this field.
- today writes more Workmen's Compensation for the coal industry than any other carrier.

ASSETS OVER $12,000,000

BITUMINOUS CASUALTY CORPORATION

ROCK ISLAND, ILLINOIS

Specify AMERICAN BRATTICE CLOTH

It's Protected Against

FLAME
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SHRINKAGE



AMERICAN
BRATTICE CLOTH CORP.
WARSAW, INDIANA
AGENCIES IN ALL MINING CENTERS

trouble. However, not all brush problems are solved immediately. Double brush holders have proved very satisfactory in some cases. Split brushes are one of the new innovations. If trouble appears, investigate all angles. The manufacturers of the equipment are delighted to help out.

•

## Personal Notes

E. F. WRIGHT JR., formerly general superintendent, Southern Mining Co., Insull, Harlan County, Ky., has been appointed superintendent of the Clover Splint Coal Co. at Closplint, in the same county.

FRED LOVING JR., formerly representing the Hercules Powder Co., has been appointed superintendent of the Southern Mining Co., Insull, Harlan County, Ky.

DR. MARVIN R. EVANS, Coaldale, has been named to succeed the late Dr. Robert H. Kistler as chief surgeon for the Lehigh Navigation Coal Co. in Panther Creek Valley, Pennsylvania. Dr. Evans started working part time with Dr. Kistler Sept. 16, 1942, and carried on for 14 months or more during the latter's illness. The company medical department was started in 1915, and Dr. James H. Young, Dr. Kistler's brother-in-law, was the first chief surgeon. At his death in 1929 he was succeeded by "Dr. Bob."

WILLIAM FORD, formerly superintendent of mines of the Alma Fuel Co. and Dayton Coal Co., in Mingo County, West Virginia, has been appointed superintendent of Mines Nos. 3 and 8 of the Eastern Coal Corp., Stone, Ky.

RUFUS MCKEE, Eastern Coal Corp., Stone, Ky., has been promoted from assistant mine foreman to general mine foreman of No. 7 mine, McVeigh, Ky.

W. E. WHEELER, Eastern Coal Corp., Stone, Ky., has been promoted from safety director to assistant general manager.

L. E. BRISCOE, Petersburg, Ind., has been appointed chief engineer of the Ayrshire Collieries Corp., operating in Pike, Clay and Vermillion counties, Indiana.

DAVID H. LOACH has been appointed superintendent of the Docena mine of the Tennessee Coal, Iron & Railroad Co. Connected with the company for about 40 years, he was promoted from general mine foreman.

H. P. CULLIGAN has been named superintendent of the large stripping operations of the Brookside-Pratt Coal Mining Co. at Nauvoo, Ala. He was previously connected with the company for a long time.

B. F. STILWELL, chief fuel engineer for the last eight years with the Red Jacket Coal Sales Co., Columbus, Ohio, has resigned and accepted appointment as special representative for the North American Coal Corp., Cleveland.

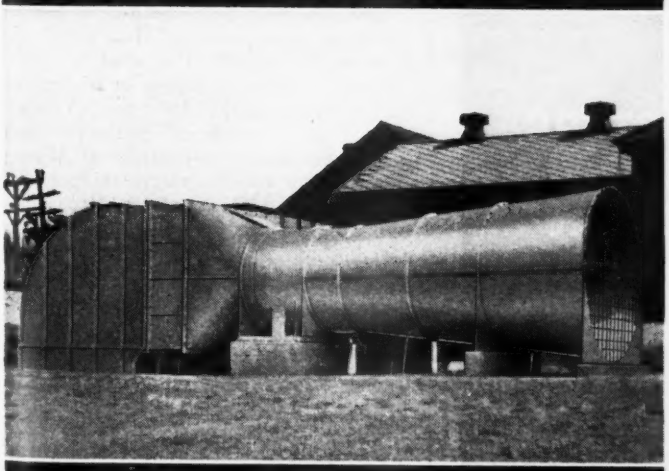
B. H. MCCRACKIN, formerly associated with the Consolidation Coal Co. at Frostburg, Md., has been appointed general

# 3 BASIC ARGUMENTS

## FOR PROPER MINE VENTILATION



La-Del Troller 8 foot diameter, high-pressure mine ventilating fan, attached to shaft.



A 6 foot diameter high pressure fan—on exhausting service—coupled to air shaft hood.

## 1. Increased Safety

By eliminating the danger from smoke and noxious fumes that can kill or disable men, and interrupt production for long periods, proper ventilation increases safety . . . permitting higher efficiency and additional output.

## 2. Improved Working Conditions

Benefits from improved working conditions have been proved over and over. Many major operators are finding it possible to increase production in close, confined, foul-air areas with an efficient air circulating system. And for maximum efficiency, at low installation cost, they are turning to La-Del Axial Flow Ventilating Fans.

## 3. Reduced Operating Costs

If reduced operating costs are important in your mine operations, you'll want to apply the increased safety and improved working condition features offered by La-Del Axial Flow Fans. La-Del engineers will gladly make a study of your requirements—so, when La-Del fan production is no longer needed by our Armed Forces, you can proceed with your installation immediately.

### *Important Features*
### of La-Del Axial Flow Fans

- ★ Exclusive adjustable pitch propeller blades.
- ★ Rigid straightening vanes for true axial flow.
- ★ Streamlined tail to maintain uniform axial flow without turbulence.
- ★ Compact, space-saving for low-cost installation.
- ★ Reliable, constant, unexcelled performance; free from maintenance trouble and expense; control ease; quiet operation.

### LA-DEL MINE EQUIPMENT

La-Del has an underground conveyor system for every mine requirement—belt, chain or shaker types. All feature extreme simplicity, through elimination of non-essential mechanical parts; long, efficient life with low-cost operation and maintenance.

MATERIAL HANDLING LA-DEL MINE VENTILATION

ARMY E NAVY

# LA-DEL CONVEYOR AND MANUFACTURING CO.

New Philadelphia, Ohio

COMPLETE LINE OF UNDERGROUND CONVEYORS FOR LOW COST OPERATION



*Increase Production*
*With*
**WILLISON**
**Automatic Couplers**

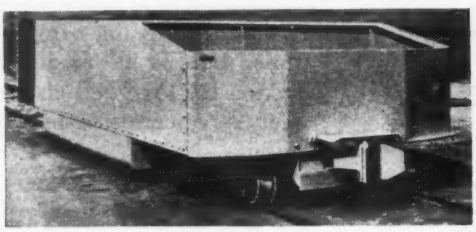
*With simple spring draft gear*

*Speed haulage operations—Reduce accidents*

**WILLISON**
**Automatic Couplers**
*Pay Dividends*

1. *In Faster Operation*
2. *In Increased Tonnage*
3. *In Fewer Accidents*
4. *Protection to cars thru ample cushioning and reduction of slack.*

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Circular No. 5240
*Write today*





*With National Friction Draft Gear*

NATIONAL MALLEABLE & STEEL CASTINGS CO.
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*The Unbreakable*
STEEL GRID RESISTORS
*for*
HEAVY DUTY SERVICE
*in* COAL MINES



★ LOCOMOTIVES
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★ CONVEYORS

*"The Resistor you can Install and Forget"*

THE POST-GLOVER ELECTRIC COMPANY
ESTABLISHED 1892
221 WEST THIRD STREET, CINCINNATI, OHIO


manager of the coal mining division of the Republic Steel Corp. He is being transferred from the Cleveland office of the company, where he was in the engineering department, coal and ore mines division.

WALTER ZACK, mechanization engineer, Buckeye Coal Co., Nemacolin, Pa., has been advanced to mine superintendent.

AYRSHIRE PATOKA COLLIERIES CORP., Indianapolis Ind., has changed its name to Ayrshire Collieries Corp.

•

## To Hold 3d Hearing on Supervisors

Having concluded its second session Nov. 17 in Pittsburgh, the War Labor Board hearing the coal-mine supervisory dispute set Nov. 28 for the third session. Though testimony has been completed only in the Ford Collieries Co. and Rochester & Pittsburgh Coal Co. cases, it is said much of the evidence already introduced is applicable to the remaining three cases, making it likely that the panel's hearings would be completed at the next session.

It was said that, in addition to the regular witnesses for the parties concerned in the Nov. 28 hearing, the panel planned to hear from Richard Maize, Pennsylvania Director of Mines, and E. A. Delaney, Deputy Attorney General, in reference to a statement at the last session that some of the terms and conditions asked by the union might violate State mining statutes.

•

## Anthracite Heater Shown to Engineers

The new automatic anthracite burner known to engineers as a "Heat Jeep" was demonstrated by Dr. Raymond C. Johnson, vice president in charge of research of Anthracite Industries, Inc., to 225 members of the Pennsylvania Anthracite Section of the American Institute of Mining and Metallurgical Engineers at their fall meeting, held Oct. 27 at the Westmoreland Club, Wilkes-Barre, Pa. Dr. Johnson was introduced by Frank W. Earnest, president of Anthracite Industries. Developed in the laboratory of the Anthracite Institute, Primos, Pa., the new unit is still in the experimental stage.

Edward Griffith, vice president and general manager, Glen Alden Coal Co., chairman of the meeting, was introduced by L. D. Lamont, Philadelphia & Reading Coal & Iron Co., who is chairman of the Pennsylvania Anthracite Section of A.I.M.E.

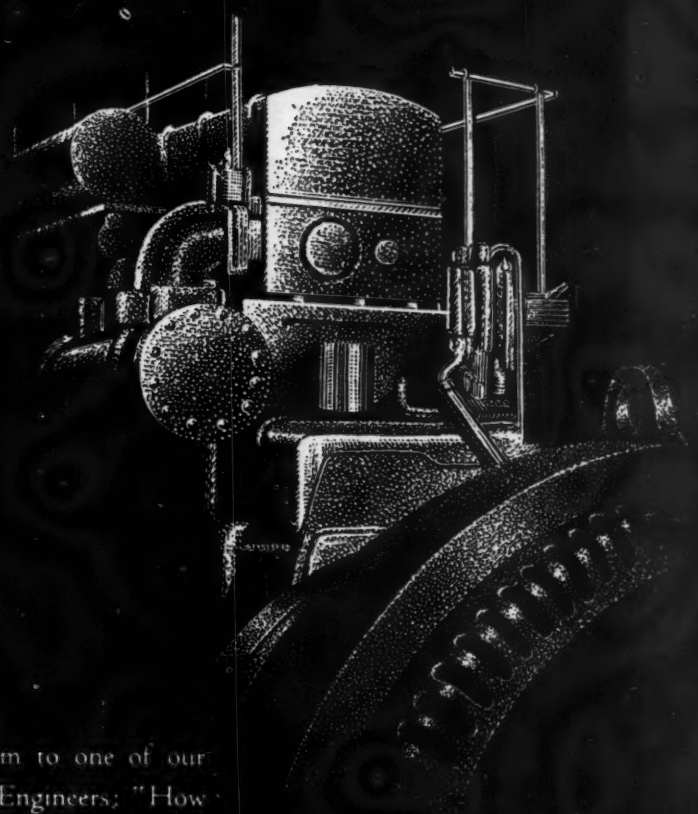
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## Obituary

J. K. F. BROWN, assistant general manager of the Hudson Coal Co., in charge of engineering, died of a heart ailment Nov. 7 at his home in Scranton, Pa.

HENRY DEMPSEY, 57, for the last 22 years night boss at Harco No. 47 mine of

# EXAMPLE OF *Service*:

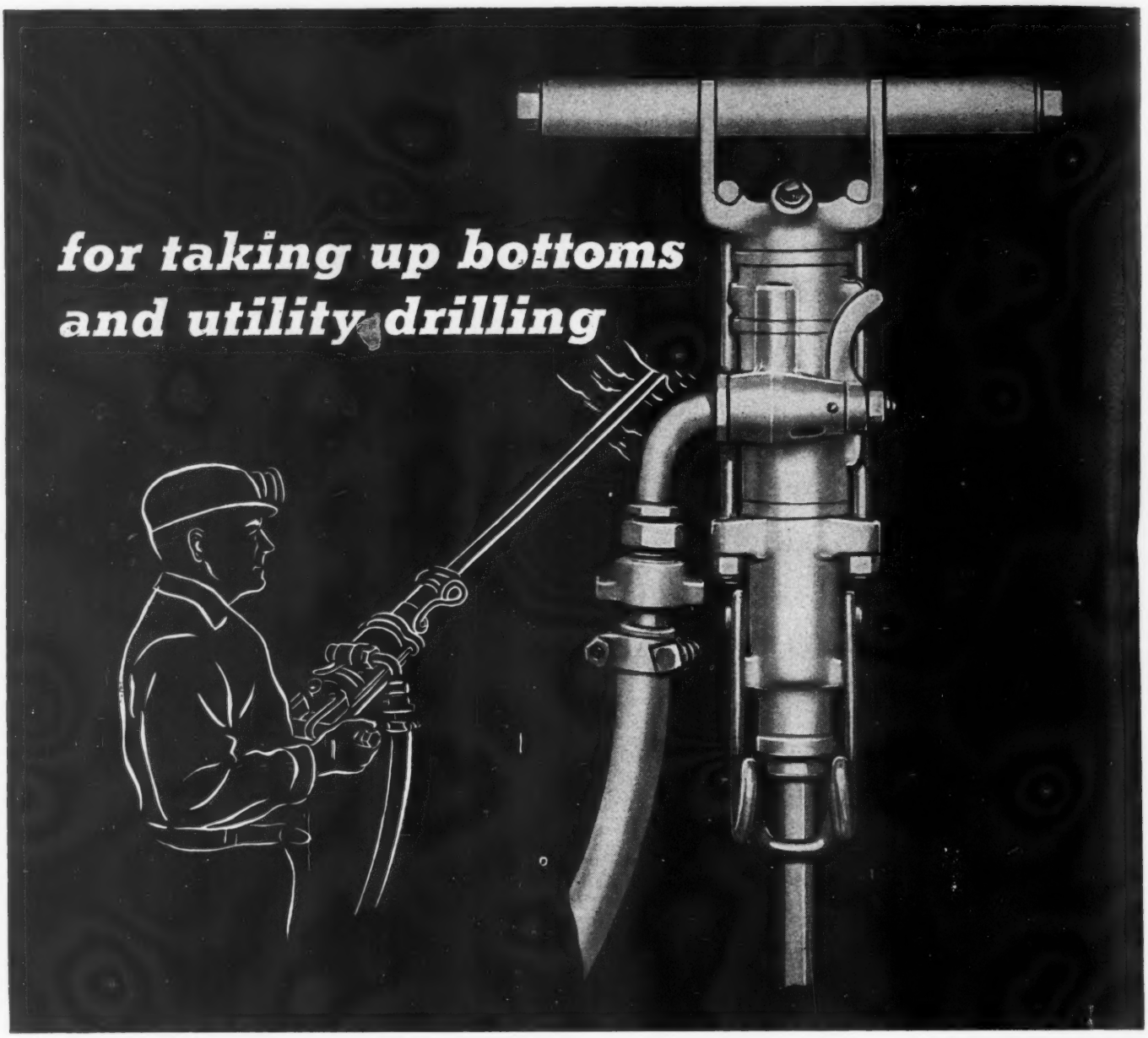


A large company put this problem to one of our Cities Service Diesel Lubrication Engineers: "How can we reduce Diesel breakdowns that are seriously interfering with production?"... Our engineer studied the facts and recommended a special Cities Service Diesel lubricant. In 38 months since, Diesel efficiency has been steadily maintained, with engine overhauls reduced by the amazing figure of 30%.

**More and more, it's service that counts...**

**and *Cities Service* means good service!**

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# LIGHT-WEIGHT CP-22 SINKER

WITH its high drilling speed, good hole cleaning and low air consumption, the 28-lb. CP Sinker is an exceptionally efficient tool for its weight. It is ideal for taking up bottoms, brushing down, drilling coal and general utility work. Long life and low maintenance are assured by full cushioning, automatic lubrication and other Chicago Pneumatic features. Write today for further information.

**CP makes a sinker drill for every purpose from the light 28-pound CP-22 to the 119-pound heavy duty CP-60. Write for a copy of Bulletin No. 850.**

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PNEUMATIC TOOLS
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HYDRAULIC TOOLS
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★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

the Peabody Coal Co., near Harrisburg, Ill., died Nov. 2 at his home in Harrisburg following a heart attack.

TURNER ASHBY PAYNE, 85, a pioneer coal-mining executive in Alabama and for many years connected with the operations of the Sloss-Sheffield Steel & Iron Co. at Blossburg and other places, died Oct. 27 at Moultrie, Ga.

ARTHUR E. MARRIOTT, 62, one of the owners of the Marriott-Reed coal mine, in northeast Callaway, Mo., died Oct. 27 at Woodland Hospital, Moberly, Mo., after a protracted illness. He also was interested in the Marriott-Reed strip mine at Lindberg, Mo.

PATRICK A. SHOVLIN, 60, superintendent of Loomis colliery, Glen Alden Coal Co., Nanticoke, Pa., died Nov. 24 at his home in Hanover Township, Pa., after an illness of several days. He had been in Glen Alden employ for 35 years, prior to which he was with the Hudson Coal Co. at Larksville.

•

## Association Activities

HARLAN COUNTY COAL OPERATORS' ASSOCIATION elected as president A. F. Whitfield, Jr., secretary-treasurer, Clover Splint Coal Co., at its annual meeting. C. V. Bennett, president, Harlan Central Coal Co., was elected vice president and George S. Ward was renamed executive secretary and treasurer. The executive board named includes: Pearl Bassham, Kenes Bowling, R. W. Creech Jr., W. J. Cunningham, S. J. Dickenson, J. S. Greene, Charles S. Guthrie, Elmer D. Hall, P. O. Lewis, J. S. Robinson and J. E. Taylor.

•

## Preparation Facilities

PAU MAU COAL CO., Muhlenburg County, Kentucky—Contract closed with McNally-Pittsburg Mfg. Corp. for complete raw-coal preparation plant with capacity of 400 t.p.h. mine-run feed incorporating the following features: breaking plus 6-in. lump to minus 6-in.; hand-picking bone coal and rock from 6 to 1¼ in.; sizing 0x6-in. coal into 6x3-, 3x1¼- and 0x1¼-in.; boom loading into railroad car 6x3- and 3x1¼-in.; 0x1¼-in. chute-loaded direct to railroad cars; and receiving hand-picked rock in refuse bin for ultimate disposal; to be completed about Jan. 15, 1945.

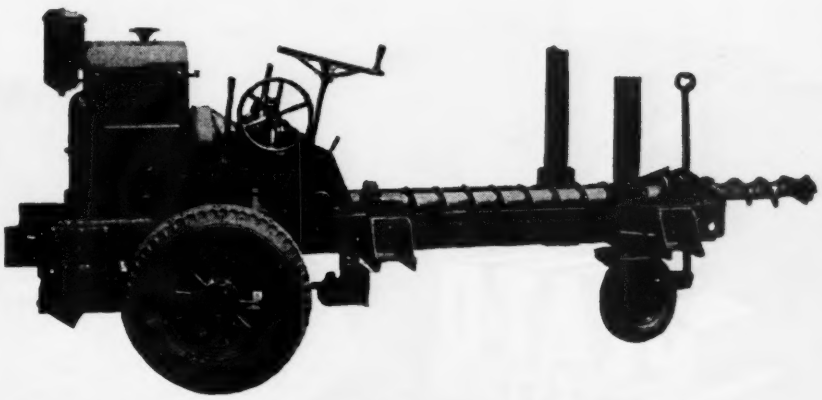
MARIGOLD COAL MINING CO., Jasper, Ala.—Contract closed with McNally-Pittsburg Mfg. Corp. for No. 523 McNally-Norton automatic washer having capacity of 275 t.p.h. of 6-in. minus coal, along with auxiliary equipment to be installed in existing tipple having capacity of 400 t.p.h.; cleaned coal products will be loaded on four tracks: 6-in. lump, 6x3 egg, 3x1½ nut and 1½x0 screenings; to be completed about February, 1945.

CHAFIN-JONES-HEATHERMAN COAL CO., Peach Creek, W. Va.—Contract closed with Kanawha Mfg. Co. for washing plant with capacity of 185 t.p.h. of 0x6-in. coal consisting of raw-coal and mixing con-


**PARMANCO Horizontal Drills**

***"Positive Control Drilling"***

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling — All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators — Write us your drilling problems.



**PARIS MANUFACTURING CO.**

**PARIS, ILLINOIS**



GIVE YOUR DEALERS A BREAK THIS WINTER

**Freezeproof your coal with**

**WYANDOTTE CALCIUM CHLORIDE**

YOU help your dealers meet delivery schedules and build good-will, too, when you freezeproof coal shipments with Wyandotte Calcium Chloride.

Coal treated with Wyandotte Calcium Chloride doesn't freeze in the cars, so it's easily and quickly handled at the yard. There's no degradation either as there is when frozen coal is smashed in unloading.

No special equipment is needed to handle Wyandotte Calcium Chloride for freezeproofing. It may be applied by hand shovel in dry flake form—exactly as it comes out of the bag.

Let us tell you more about the advantages of using Wyandotte Calcium Chloride to freezeproof coal. Just mail the coupon.

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Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

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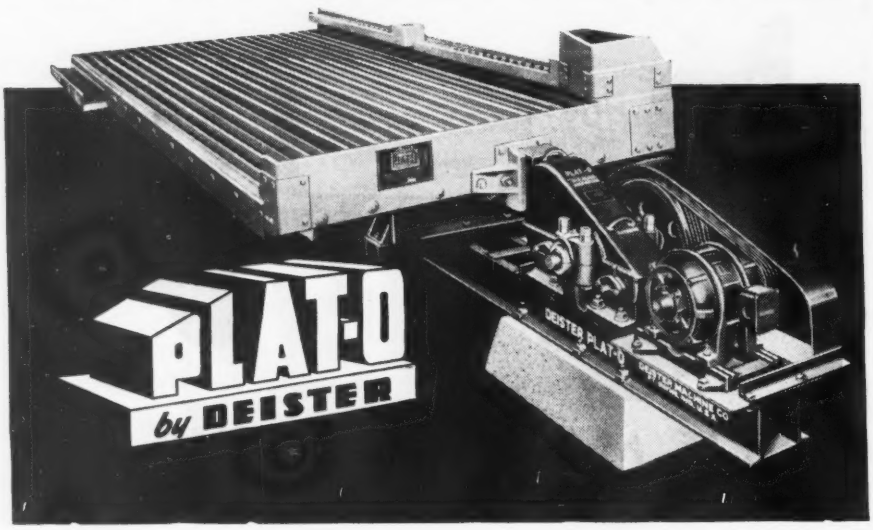
Here's Wet Gravity Separation AT ITS BEST

● There's no need now to write off culm banks and tailing pond accumulation as "waste" . . . not when you can obtain a Plat-O Coal Washing Table.

The Plat-O Table gives you wet gravity separation at its best . . . gives you a new source of profitable production at low cost. Plat-O efficiently reclaims sizes as small as 1/16" x 0. One man can handle up to 20 tables (each producing 15 or more tons per hour) because separation is automatic and in full view.

Write today for complete information. Deister engineers will be glad to give you the benefit of their specialized experience in wet gravity separation—without obligation.

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DEPENDABLE PERFORMANCE Always
Standard and Special Mine Track Work.




For more than sixty years Weir Kilby has been manufacturing good quality trackwork for Railways, Mines, and Industrial plants. As rolling stock and other apparatus have become heavier we have improved and strengthened our product to meet these new service demands. Our many customers are pleased with our good deliveries, reasonable prices and superior product. We will be glad to work with you. Many items, such as TITAN Frogs, Switches, Switch Stands, etc., can be shipped from stock. Others will be made up promptly.



CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. Copy on request.

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veyor, Allis-Chalmers Ripl-Flo vibrator, Jeffrey diaphragm jig, sizing and dewatering shaker screen, settling cone, middlings crushing and recirculating system.

Carbonifera De Ancos, S. A., Peru, S. A.—Contract closed with Deister Concentrator Co. for five SuperDuty diagonal-deck No. 7 washing tables to treat pea, No. 1 buckwheat, rice, barley and No. 4 buckwheat sizes.

N. E. Herrold, Sanbury, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty diagonal-deck No. 7 washing table to clean rice coal.

William B. Shoener, Auburn, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty diagonal-deck No. 7 washing table to handle No. 4 buckwheat coal.

South Tamaqua Coal Pockets, Tamaqua, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty diagonal-deck No. 7 washing table to treat No. 1 buckwheat coal.

Chafin-Jones-Heatherman Coal Co., Peach Creek, W. Va.—Contract closed with Jeffrey Mfg. Co. for one two-compartment diaphragm jig with raw feed of 170 t.p.h. of 0x5-in. coal.

St. Louis, Rocky Mountain & Pacific Co., Raton, N. M.—Contract closed with Jeffrey Mfg. Co. for coal washing plant with raw feed of 250 t.p.h. of 0x3-in. coal.

West Virginia Coal & Coke Corp., Omar, W. Va.—Contract closed with Jeffrey Mfg. Co. for dewatering screen with raw feed of 125 t.p.h. of 5x1¼-in. coal.

DeAngelis Coal Co., Carbondale, Pa.—Contract closed with Wilmot Engineering Co. for four Type D Simplex jigs to prepare nut, pea and No. 1 buckwheat; feed capacity of each jig, 20 t.p.h.

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## Travel Pay Goes To Supreme Court

The travel pay question reached the Supreme Court Dec. 2, when the Jewell Ridge Coal Corp. asked the court to review the decision of the Fourth Circuit Court which on Oct. 6, at Asheville, N. C., ruled portal-to-portal travel time as work time under the Fair Labor Standards Act.

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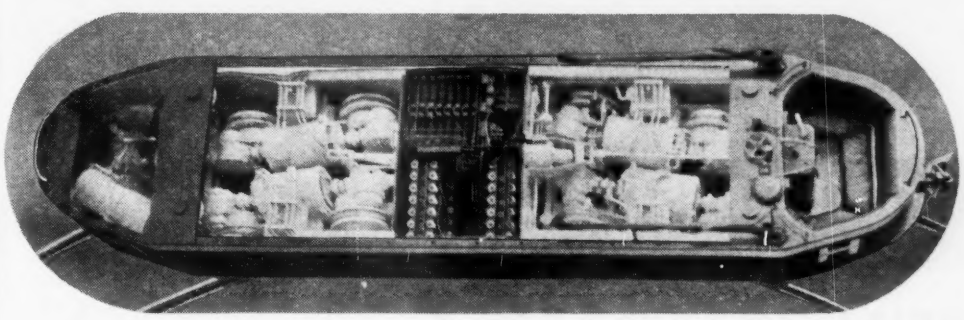
## New Coal Locomotive Powered by Turbine

A fundamentally new type of coal-burning steam locomotive, powered by a turbine instead of the cylinders, pistons and driving rods of the conventional design, has been completed for the Pennsylvania R.R. It is the first direct-drive steam turbine locomotive ever built in the United States.

In the new locomotives, designated Type S-2, the turbine shaft is rotated by the pressure of jets of steam against the vanes of the turbine wheel, and a continuous

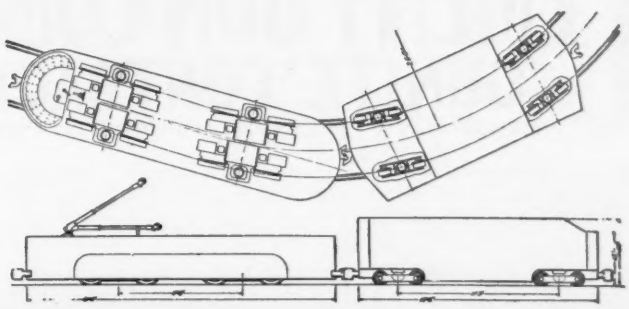
# DIFFERENTIAL
## 8 WHEEL AXLESS LOCOMOTIVES...

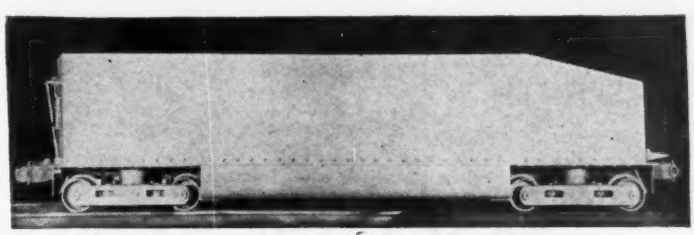




**Plan View . . .**
shows 21-ton Differential AXLESS locomotive on a 25-foot radius curve — notice compact design and accessibility for easy maintenance.

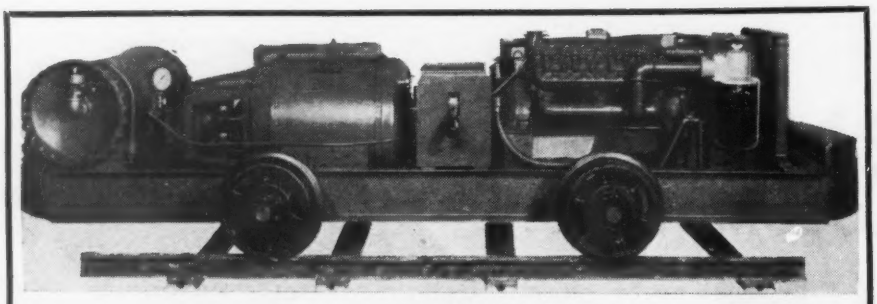
• Differential 360 HP 8-wheel AXLESS locomotives provide ample power for hauling larger trains—faster—at lower cost. These streamline heavy duty locomotives have more adhesion available for tractive effort and braking due to tandem drive corrective for transfer of weight. There is no connection between wheels on one rail and wheels on the other, therefore, in negotiating a curve there is no slippage caused by difference in wheel travel. By eliminating this slippage, adhesion between rail and wheel is unbroken and there is no drawbar pull loss. This modern AXLESS truck locomotive provides greater traction—power on all eight wheels—smooth riding—thus enabling it to haul heavy loads at high speeds in safety. Full anti-friction bearings and gears operate in a bath of oil sealed away from dirt.





Large Differential mine cars with patented 8 wheel AXLESS trucks provide greater carrying capacity within a limited height—require fewer cars and less maintenance. Smooth riding reduces spillage on haulage ways and assures safety at higher speeds. Less cost per ton—more tons per shift.

**DIFFERENTIAL STEEL CAR COMPANY**
**FINDLAY, OHIO, U. S. A.**
*Builders of Haulage Equipment Since 1915*
AIR DUMP CARS · MINE CARS · MINE LOCOMOTIVES · ROCK LARRIES · DUMPING DEVICES
BURDEN-BEARING LOCOMOTIVES · STOCKPILING CARS · COMPLETE HAULAGE SYSTEMS



# ACME "LOWBOY" *Model 110* MINE CAR AIR COMPRESSOR

***Just ask for BULLETIN 3920***

For full particulars on construction, operation, and general specification.

The Model 110 Acme "Lowboy" Mine Car Air Compressor is designed to meet the mining conditions existing today, especially in mechanized mining.

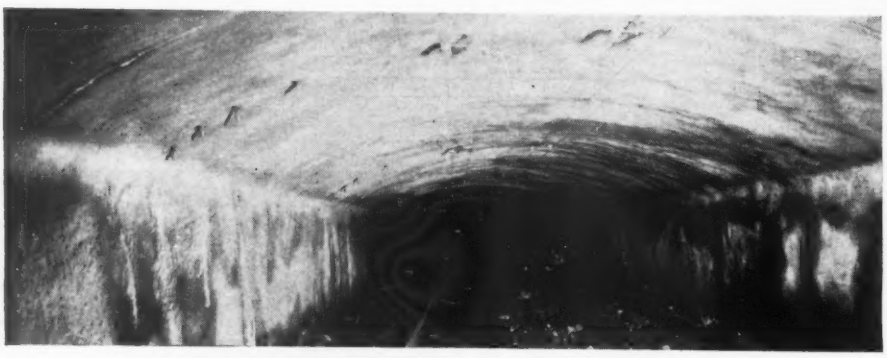
Low—compact—light weight—it is adaptable to both high and low seam operations and offers the additional advantage of efficient, economical service.

Designed particularly for mine service the unit is an adaptation of the Schramm Fordair which has proved highly efficient and dependable in many fields of service.

Its mechanical simplicity—portability—and rugged construction make it ideal for mine use.

**ACME COMPRESSOR CO.**
Williamson, West Virginia

# CEMENT GUN COMPANY
## "GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



## ROOF LEAKS ELIMINATED

The coal mine haulageway above presented a major "headache" due to a very leaky roof, amounting to over 1000 gallons a minute. The roof was arched and wire mesh reinforced "GUNITE" averaging 4" thick was applied. The ribbed sides were built of 2½" "GUNITE". We did this work in 1926 and entirely eliminated water troubles and roof fall hazards.

"GUNITE" has many uses in mines. A one inch lining of "GUNITE" will stop air slacking, thus eliminating much timbering. A "GUNITE" lining means cleaner entries and passageways, better visibility, and more head room, better ventilation, and generally lower maintenance costs.

We are "GUNITE" contractors and can do your work. Write for our Bulletin 2200, or have one of our engineers around for a discussion of your needs.

**MANUFACTURERS OF THE "CEMENT GUN"**

flow of power is transmitted to the driving wheels through speed-reducing gears. A product of continuing research and development, the engine was designed and constructed by the Baldwin Locomotive Works and the Westinghouse Electric & Mfg. Co., in collaboration with the Pennsylvania R.R.

Development of the new steam turbine locomotive follows the placing in service of several other new types of steam engines for test and observation purposes while in process of research and design. In addition, construction is progressing at the railroad's Altoona (Pa.) works on 25 newly designed multiple-cylinder freight locomotives of Type Q-2, recently announced. The first of this order has been delivered and already is in operation.

The purpose of developing the new steam turbine locomotive is to eliminate the reciprocating parts of the conventional steam locomotive, obtain a uniform flow of power to the driving wheels and obtain the economies inherent in a turbine for railroad motive power. The turbine is designed to develop 6,900 shaft horsepower, providing power at the tender coupler sufficient to pull a full-length passenger train at 100 miles per hour and high-class freight trains at high speeds.

### Simple to Operate

The new engine is one of the simplest to operate ever constructed. Both forward and reverse movements, at all speeds, are controlled by a single lever, actuating specially designed pneumatic control apparatus. Automatically functioning devices make incorrect handling of the mechanism impossible.

Smaller than a living room easy chair and accounting for less than 1 percent of the locomotive's total weight, the main, or forward-drive, turbine is mounted at the right-hand side of the locomotive. It is about 3 ft. 9 in. in diameter. A smaller turbine, designed to move the locomotive backward at speeds up to 22 miles an hour, is mounted on the left side and is brought into operation by engaging a clutch.

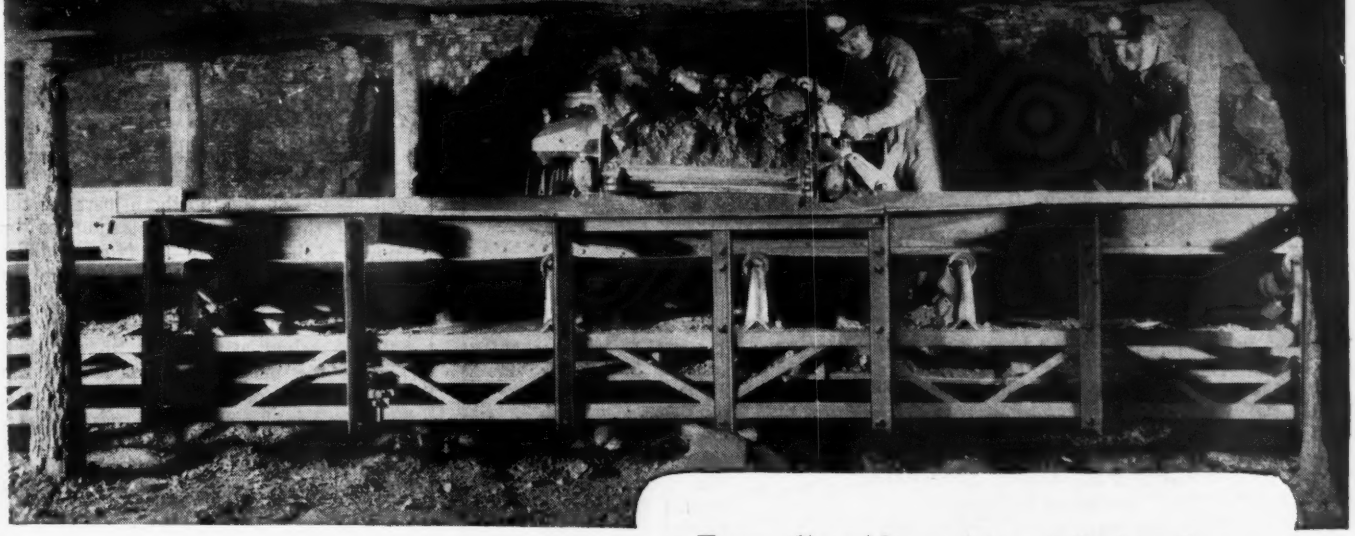
There are more than 1,000 chromium steel vanes in the forward turbine, some of which are less than 1 in. long. Steam travels through the entire battery of turbine blades, expending all of its energy except approximately 15 lb., which produces a non-pulsating draft through the firebox and boiler. The boiler is of the conventional type, carrying 310 lb. of steam pressure and fired by mechanical stoker.

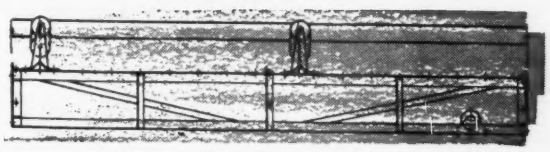
The heat-treated alloy-steel reducing gears into which the turbine shaft feeds its power operate continuously in an oil bath and mesh with so little friction that 97 percent of the turbine's power reaches the driving wheels. Power is applied directly to two center pairs of driving wheels and transmitted to two additional pairs of drivers by connecting rods.

The engine and loaded tender weigh nearly 1,000,000 lb. and cover 123 ft. of track. The tender has a water capacity of 18,000 gal. and carries 37½ tons of coal.

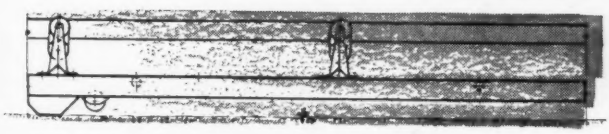
Dec. 2 also brought an announcement by the New York Central, Pennsylvania, Baltimore & Ohio, Chesapeake & Ohio, Reading, Louisville & Nashville, Norfolk & Western, Virginian and Illinois Central

# How B G CONVEYORS MEET VARIED MINE CONDITIONS

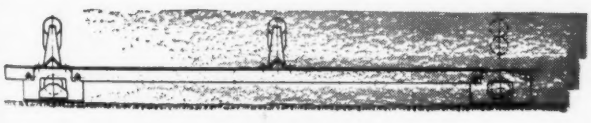




**Truss Conveyor Frame**
***Built for Strength and Endurance***



**Channel Conveyor Frame**
***Ideal for Low Headroom***



**Low Seam Conveyor Frame**
***Designed for Frequent Moving***

• From the wide variety of Barber-Greene *standardized* frames, terminals, power drives and take-ups, you can select those units best suited to the particular requirements of an underground conveying system in your mine.

Truss frames, for instance, are designed for main-entry duty. The truss design provides extra rigidity to maintain true alignment over uneven bottom curves and for long unsupported spans.

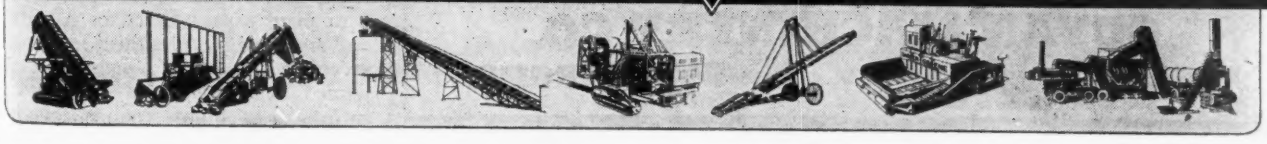
Channel frames have sturdy skid legs for low mounting directly on the mine floor. Just bolt the sections together — each one is a self-contained unit.

And when frequent extension or moving is required, the demountable frame of the low seam conveyor will save many hours of precious time.

Barber-Greene conveying equipment can be easily adapted to your mine. Mine Catalog 66 illustrates with many drawings and installation photos how B-G mine conveyors are now meeting a variety of mine conditions. For your copy, write to Mining Department, Barber-Greene Company, Aurora, Illinois.

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GUYAN MACHINERY CO.
LOGAN WEST VIRGINIA


railroads that they are spending $1,500,000 in the development of a 5,400-hp. turbo-electric road locomotive to burn pulverized coal. The locomotive, it is stated, will be built by the General Electric Co. in cooperation with the research departments of the railroads and will use a special boiler to be constructed by Babcock & Wilcox.

•

## North France Mines Are Nationalized

A decree was adopted by the French Government Nov. 28 nationalizing the coal mines of the northern part of the country through an organization to be known as the Mines of the Nord and Pas de Calais departments, according to a dispatch to the New York *Times*. Security holders will be compensated on the basis of values as of 1938, it was said. This is the first major step toward the nationalization of key industries demanded by resistance leaders. The next step is expected to be nationalization of the Loire coal fields on similar lines, the Cabinet having arranged to consider the matter at an early meeting.

•

## Coal Publications

*Blasting Hazards in Strip Mines Adjacent to Underground Workings*, by J. J. Forbes and H. F. Weaver, U. S. Bureau of Mines. I. C. 7296, 5 pp., 8x10½ in., mimeograph; paper. Hazards described are solely those relative to the entry of carbon monoxide in underground workings from shooting in strip mines, not about hazards in open-cut operations, as the title seems to imply. Shots should be fired only when subterranean mines are idle, so as to permit gases released by incomplete combustion to be removed before men reenter. Instances of poisoning in deep mines from exploding of dynamite and liquid oxygen in propinquitous strip mines are cited.

*Control of Silicosis Hazards by Substitution of Quartz-Free or Low-Quartz Material for Sand Under Mine Locomotives*, by C. E. Brown and H. H. Schrenk, U. S. Bureau of Mines. I. C. 7297, 5 pp., 8x10½ in., mimeograph; paper. Iron-ore tailings having 8 percent of quartz used by Hudson Coal Co., slag from copper furnace having 1 percent of quartz used by Tennessee Copper Co., ferro-chrome slag tailings having 11 percent of quartz used by an unstated company. Anaconda Copper Mining Co. found that slag from copper smelter caked in sand boxes and did not prevent locomotive wheels from slipping. A blast-furnace slag proved less effective than sand.

*Coals of Alberta, Their Occurrence, Analysis and Utilization*, by E. Stansfield and W. A. Lang, Research Council of Alberta, University of Alberta, Edmonton, Alta., Can. Report 35, 174 pp., 6½x10 in., with map; paper. Describes Alberta's 46 coal areas and classifies them in five groups according to "rank"; or should it be termed "maturity"? No meta-anthracite, anthracite or brown coal is found, but

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In Macwhyte PREformed Wire Rope, Internal Lubrication increases the life of the rope, thereby reducing operating costs.

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Operators of equipment prefer Macwhyte PREformed Wire Rope because it operates so smoothly and spools on the drum so well.



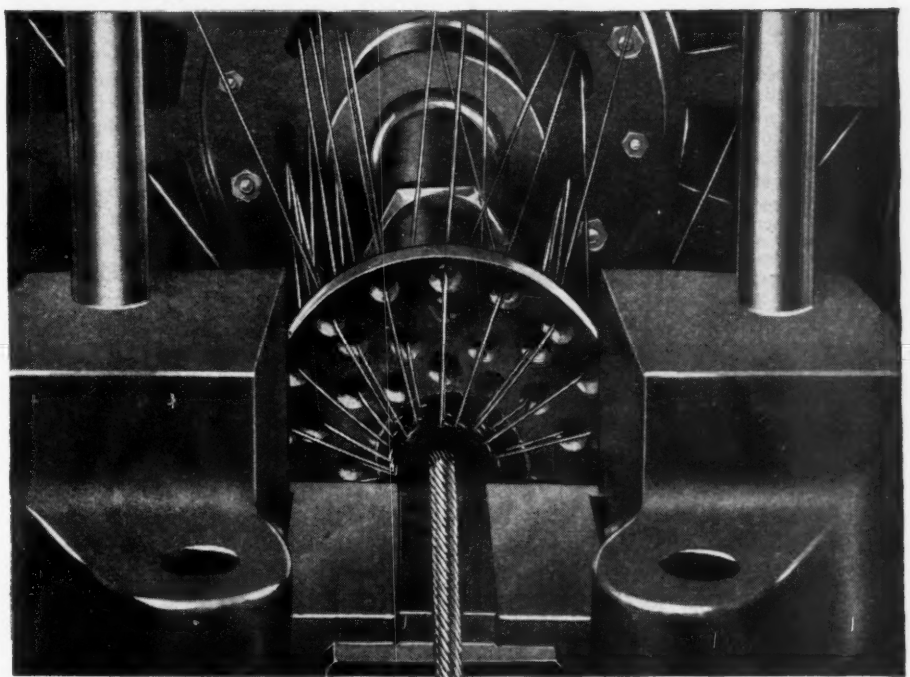
**Macwhyte Wire Rope Lubricant is packed around each wire in all strands of Macwhyte Wire Rope.**

If you have a service problem, Macwhyte Wire Rope engineers stand ready to give you the benefit of their experience in selecting the proper size, grade, and construction.

The demands of our armed services are so great now, there may be times when we cannot give you our usual prompt service and delivery. The situation changes from day to day so please keep trying to get Macwhyte Wire Rope. We'll serve you if we possibly can.

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18 illustrated articles on the use and care of Wire Rope have been bound into an 8½" x 11" book which is available free to Wire Rope users requesting it on their company letterhead. Ask for Bulletins No. 43-85.



**The above illustration shows how internal lubrication is applied to Macwhyte PREformed ropes. *(Top of stranding die is removed.)* Note the wires pass through the lubricant which is pumped up from below and therefore each wire is completely covered and all spaces between the wires in the strand completely filled.**

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*The correct rope for your equipment*

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*Wire Rope Manufacturers*

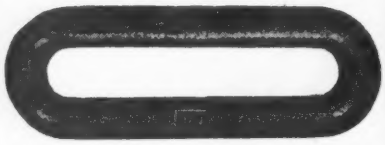
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all gradations from semi-anthracite to lignite. Nordegg has coal with ash-softening temperatures up to 2,800 deg. F. The lowest is in the Taber District and is 1,870 deg. F. Book is addressed to both producers and consumers.

*Manual of Machine Shop Practice*, by Otis Benedict, Jr., McGraw-Hill Book Co. 249 pp., 4¾x7½ in.; cloth; price, $1.75. Covers machine-shop calculation, cutting speeds, time required for turning or boring, threads, tapers, gages, gaging, precision measuring, punches, dies, power requirements, etc.

*Theory and Practice of Reinforced Concrete*, by C. W. Dunham, McGraw-Hill Book Co. 558 pp., 5¼x8½ in.; cloth; price, $4.50. A book on design of reinforced-concrete structures.

*Theory and Applications of Electron Tubes*, Second Edition, by H. J. Reich, McGraw-Hill Book Co. 716 pp., 5¾x9⅛ in.; cloth; price, $5.

*The Flow of Coal-Ash Slag on Furnace Walls*, by P. Cohen and W. T. Reid, U. S. Bureau of Mines. T.P. 663, 22 pp., 5⅞x9⅛ in.; paper.

*Analyses of Pennsylvania Anthracitic Coals*, by several authors, U. S. Bureau of Mines. T.P. 659, 271 pp., 5¾x9⅛ in.; paper. Greatest aggregate thickness of coal beds in anthracite region is in the Mahanoy district, 113 ft. "All the coal is of Pennsylvania age, although originally it may have extended up into the Permian," declares Dr. George H. Ashley. (Some of the seams in the Pottsville area long have been credited to the Permian period.) Analyses of mine, breaker and delivered coal and of mine samples form the bulk of the material presented in this publication, but the introductory articles on anthracite geology, reserves, mining methods, production, distribution and use and relation of mine samples to commercial shipments are intriguing.

•

## Coal-Mine Fatalities Remain at Low Level

Accidents at coal mines of the United States caused the deaths of 75 bituminous and 12 anthracite miners in September last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 50,010,000 net tons, the accident death rate among bituminous miners in September last was 1.50 per mililon tons, compared with 1.39 in the preceding month and 1.88 in September, 1943.

The anthracite fatality rate from accidents in September last was 2.20, based on an output of 5,443,000 tons, against 2.51 in the preceding month and 7.08 in the ninth month of 1943.

For the two industries combined, the accident fatality rate in September last was 1.57, compared with 1.49 in the preceding month and 2.36 a year earlier.

Fatalities during September last, by causes and states, as well as comparable rates for the first nine months of 1943 and 1944, were as follows:

**U. S. COAL-MINE FATALITIES IN SEPTEMBER, 1944, BY CAUSES AND STATES**

| State | Underground: Falls of Roof | Falls of Face | Haulage | Gas or Dust Explosions | Explosives | Electricity | Machinery | Other Causes | Total Underground | Shaft | Open-cut | Surface | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arkansas | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 |
| Colorado | .. | .. | 1 | .. | .. | 1 | 1 | .. | 3 | .. | .. | .. | 3 |
| Illinois | 6 | .. | .. | .. | .. | .. | .. | .. | 6 | .. | .. | .. | 6 |
| Indiana | .. | .. | 1 | 1 | .. | .. | .. | .. | 2 | .. | .. | .. | 2 |
| Kentucky | 8 | 2 | 1 | .. | .. | .. | 1 | 1 | 13 | 1 | .. | 1 | 15 |
| New Mexico | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 |
| Ohio | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 |
| Oklahoma | .. | .. | 1 | .. | .. | 1 | .. | .. | 2 | .. | .. | .. | 2 |
| Pennsylvania (bit.) | 6 | .. | 4 | .. | .. | .. | 1 | .. | 11 | .. | 2 | 3 | 16 |
| Tennessee | 2 | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | 2 |
| Virginia | 1 | .. | 1 | .. | .. | .. | .. | .. | 2 | .. | .. | .. | 2 |
| West Virginia | 14 | .. | 5 | .. | 1 | .. | .. | .. | 20 | .. | .. | 2 | 22 |
| Wyoming | 1 | .. | .. | .. | .. | .. | .. | 1 | 2 | .. | .. | .. | 2 |
| Total bituminous | 39 | 2 | 15 | 1 | 1 | 2 | 3 | 2 | 65 | 1 | 2 | 7 | 75 |
| Pennsylvania (anthracite) | 7 | .. | 1 | .. | .. | 1 | .. | 2 | 11 | 1 | .. | .. | 12 |
| Grand total | 46 | 2 | 16 | 1 | 1 | 3 | 3 | 4 | 76 | 2 | 2 | 7 | 87 |

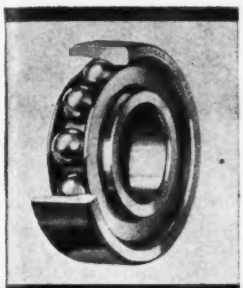
**DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS***
January-September, 1943 and 1944

| Cause | Bituminous: Number Killed | | Bituminous: Killed per Million Tons | | Anthracite: Number Killed | | Anthracite: Killed per Million Tons | | Total: Number Killed | | Total: Killed per Million Tons | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1943 | 1944 | 1943 | 1944 | 1943 | 1944 | 1943 | 1944 | 1943 | 1944 | 1943 | 1944 |
| Underground: | | | | | | | | | | | | |
| Falls of roof and coal | 503 | 407 | 1.141 | 0.862 | 88 | 60 | 1.943 | 1.220 | 591 | 467 | 1.216 | 0.896 |
| Haulage | 102 | 161 | .413 | .341 | 29 | 17 | .641 | .345 | 211 | 178 | .434 | .341 |
| Gas or dust explosions: | | | | | | | | | | | | |
| Local | 24 | 8 | .054 | .017 | 1 | 2 | .022 | .041 | 25 | 10 | .051 | .019 |
| Major | 136 | 22 | .309 | .047 | 14 | .. | .309 | .... | 150 | 22 | .309 | .042 |
| Explosives | 24 | 12 | .054 | .025 | 7 | 12 | .155 | .244 | 31 | 24 | .064 | .046 |
| Electricity | 29 | 25 | .066 | .053 | 1 | 3 | .022 | .061 | 30 | 28 | .062 | .054 |
| Machinery | 22 | 24 | .050 | .051 | 1 | .. | .022 | .... | 23 | 24 | .047 | .046 |
| Shaft | 7 | 4 | .016 | .008 | 1 | 5 | .022 | .102 | 8 | 9 | .016 | .017 |
| Miscellaneous | 24 | 88 | .054 | .186 | 9 | 11 | .199 | .223 | 33 | 99 | .068 | .190 |
| Stripping or open-cut | 18 | 20 | .040 | .042 | 8 | 5 | .177 | .102 | 26 | 25 | .053 | .048 |
| Surface | 48 | 39 | .109 | .083 | 18 | 9 | .397 | .183 | 66 | 48 | .137 | .092 |
| Total | 1,017 | 810 | 2.306 | 1.715 | 177 | 124 | 3.909 | 2.521 | 1,194 | 934 | 2.456 | 1.791 |

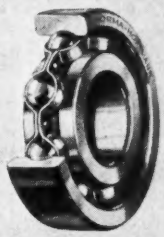
* All figures subject to revision.

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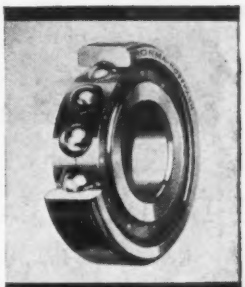
Single Row Ball Bearing

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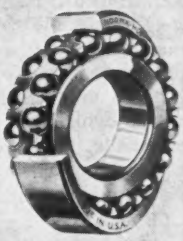
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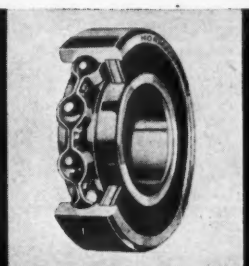
Litro ("CL") Composition Retainer Ball Bearing



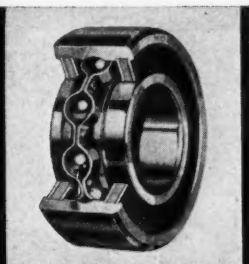
Double Row Self-Aligning Ball Bearing



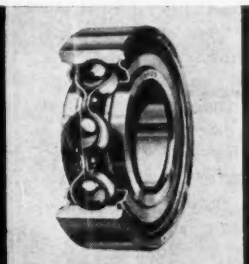
Shielded Type Single Row Ball Bearing



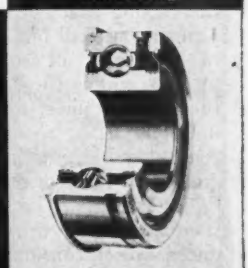
Single Felt Seal Ball Bearing



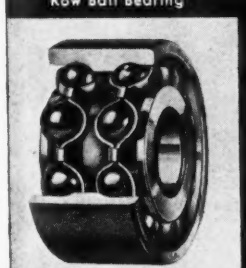
Double Felt Seal Ball Bearing



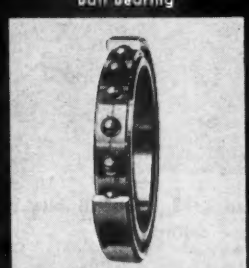
9000 Series (Feltless) Sealed Ball Bearing



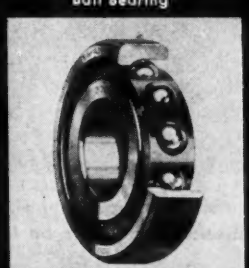
"Cartridge" Fully Sealed, Refillable Type Ball Bearing



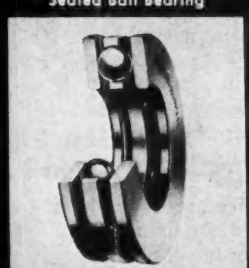
Double Row Ball Bearing



Extra Light Type Ball Bearing



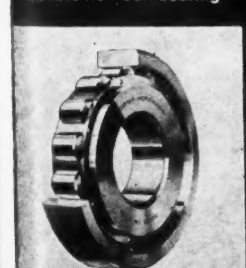
Angular Contact Ball Bearing



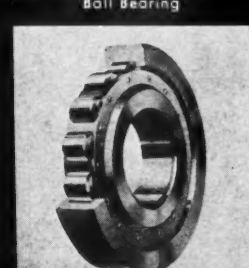
Extra Light Single Direction Ball Thrust Bearing



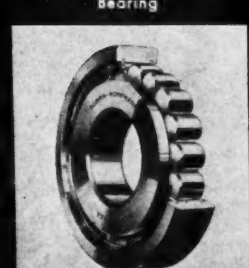
Single Direction Ball Thrust Bearing



Standard Cylindrical Roller Bearing



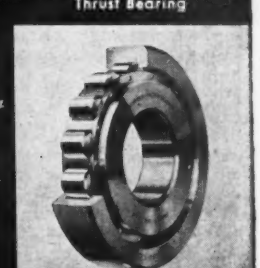
Type "E" Cylindrical Roller Bearing



Full Type (Retainerless) Cylindrical Roller Bearing



Extra Light Cylindrical Roller Bearing

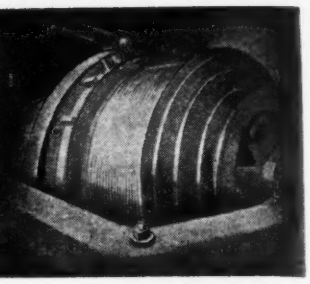


Two-Lipped Cylindrical Roller Bearing

**NORMA-HOFFMANN BEARINGS CORP'N.** STAMFORD, CONN. *Founded* 1911

*Field Offices:* NEW YORK • CHICAGO • CLEVELAND • CINCINNATI • PITTSBURGH • DETROIT • LOS ANGELES • SAN FRANCISCO • SEATTLE, WASH.

# TIPS FROM MANUFACTURERS



## Drill and Cutter Bits

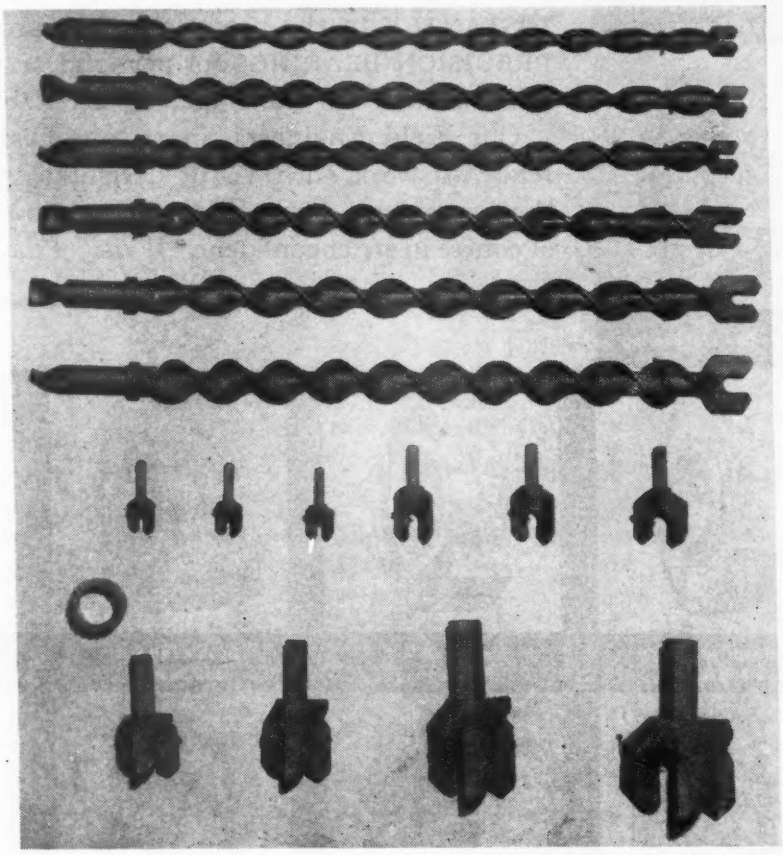
Kennametal Inc., Latrobe, Pa., offers to the coal-mining industry a complete line of new cutter and drill bits for deep and strip mining, constructed by brazing Kennametal cutting tips onto forged alloy-steel stock. With the drill bits, Kennametal also offers a line of new alloy-steel double-spiral conveyor-type augers in sizes up to 3 in., with special quick-detachable shanks which are stated to reduce whip materially, boreholes closer to actual bit gage, reduce auger-changing time and provide all the advantages of efficient hole cleaning.

The outstanding feature cited for the new cutter and drill bits is high output between regrinds, due to the long life of the cutting edges of the Kennametal tips. Kennametal drill bits have been in service in a number of coal mines for many months, and on the basis of this experience the manufacturer states that they will drill 500 ft. or more of hole in average coal before regrinding and can be reground 30 times or more before they must be discarded. The bits permit a substantially higher drilling rate with a reduced power consumption, it is declared, and by also permitting the use of auger drills in roof and bottom rock, bone and other hard material makes auger drilling advantageous where otherwise it would be impracticable.

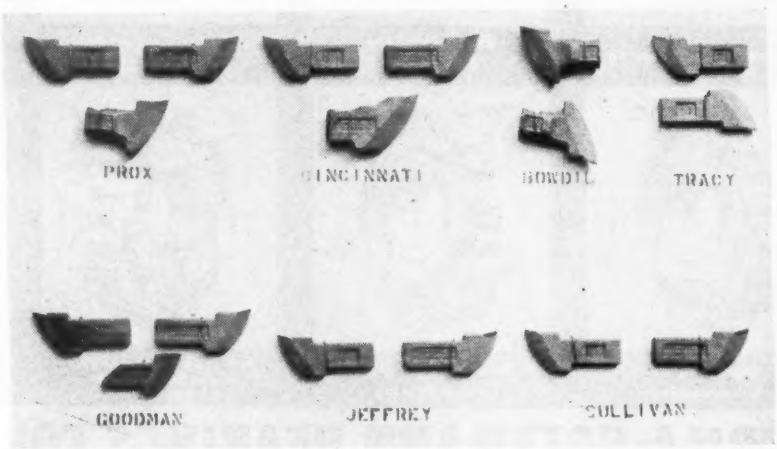
In drilling overburden in strip mining, Kennametal bits, it is asserted on the basis of extensive field experience, can drill 300 ft. or more in hard material before regrinding and can be reground 25 times or more in usual service. Footage of drill-hole per shift is increased, according to the company, 50 percent or more. Retention of the cutting edge over long periods, with consequent improvement in drilling conditions, also results in an appreciable power saving. Kennametal bits, it is stated, can be used with good production in any hardness of material ordinarily encountered in strip mining.

Kennametal cutter bits are provided in designs for all standard and special chains. Experience with actual installations shows, according to the manufacturer, that lineal footage cut before regrinding is necessary is 500 ft. or more in average coal and, as with the drill bits, the cutter bits can be reground 30 times or more before they must be discarded. Tests made in operation show power savings of 15 percent or more. With the Kennametal tips and forged alloy-steel stock it is possible to cut in bone, drawslate, fireclay, horsebacks and similar material with good efficiency, and thus make it possible to get the advantages of cutting in operations where it previously was impracticable or unduly costly.

Drill bits are furnished in $1\frac{3}{8}$, $1\frac{5}{8}$-, $1\frac{3}{4}$-, $2\frac{1}{4}$-, $2\frac{1}{2}$-, 3-, $3\frac{1}{2}$-, 4-, 5- and $6\frac{1}{2}$ in. sizes, the $1\frac{3}{8}$-in. for holes for trolley hangers, the $1\frac{5}{8}$- to $2\frac{1}{2}$-in. for powder, and the larger



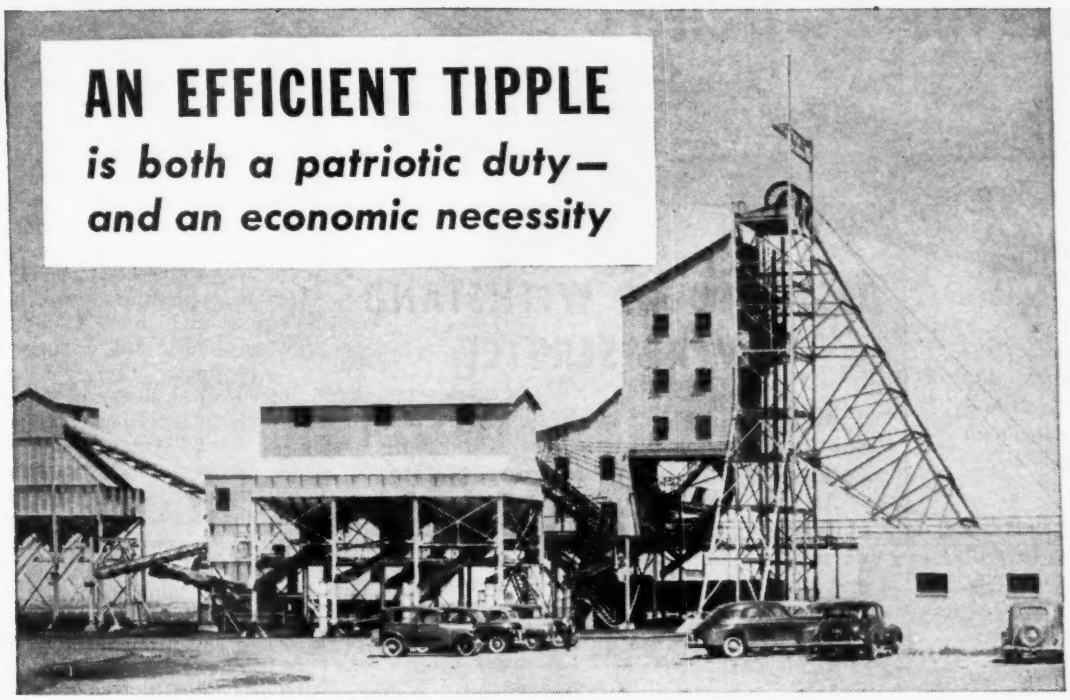
**Augers are supplied in sizes up to 3 in.; drill bits in sizes up to 6½ in.; illustration also shows bit for core drilling.**




**Bits shown fit the cutter chains named below each group.**

# AN EFFICIENT TIPPLE

## *is both a patriotic duty— and an economic necessity*



The Department of the Interior is asking all handlers of coal—from mine to consumer—to do everything possible to reduce degradation of coal sizes in order to compensate reduced output due to manpower shortages.

This makes an efficient Tipple a patriotic duty. But, beyond this, it is an economic necessity. For the amount of tonnage you put out and the amount of revenue you take in are dependent in large measure upon the efficiency of your Tipple.

A well-designed, properly-equipped Tipple can help greatly in smoothing the flow of coal from mine to carrier. Above all, it can help you immeasurably in keeping sizes—in reducing to a minimum the amount of degradation that occurs.

Robins has had quite an extensive amount of experience in Tipple design and production—extensive both in number of years and number of jobs. In every case, results have been gratifying. The layout involved the least possible number of handlings of the utmost possible tonnage. The elements—the machinery which conveys, sizes and loads the coal—were not only efficient in their own operations but were so cleverly integrated and coordinated that they made the Tipple a single, unified plant.

Whether you need a whole new Tipple or only some items of machinery—Screens, Conveyors, Feeders, Chutes or Booms—to increase the efficiency of your present one, get in touch with Robins. The suggestions of an engineer from our nearest office are at your disposal without cost or obligation. When inviting his call, please address Dept. CA-1.

ENGINEERS • MANUFACTURERS • ERECTORS

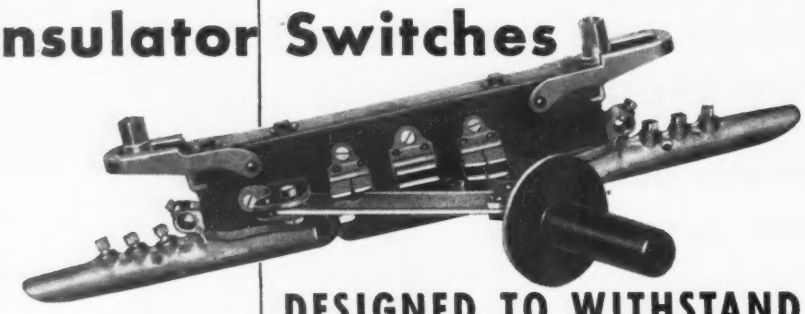
**ROBINS CONVEYORS**
INCORPORATED
Founded in 1898 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY

MATERIALS HANDLING MACHINERY

**ROBINS** *makes:* BELT CONVEYORS • COAL AND ORE BRIDGES • BUCKET ELEVATORS • CAR AND BARGE HAULS • CAR DUMPERS • CAR RETARDERS • CASTINGS • CHUTES • CONVEYOR IDLERS AND PULLEYS • CRUSHERS • FEEDERS • FOUNDRY SHAKEOUTS • GATES • GEARS • GRAB BUCKETS • PIVOTED BUCKET CONVEYORS • VIBRATING SCREENS • SCREEN CLOTH • SELF-UNLOADING BOAT MECHANISMS • SKIP HOISTS • STORAGE AND RECLAIMING MACHINES AND SYSTEMS • TAKEUPS • LOADING AND UNLOADING TOWERS • TRIPPERS • WEIGH LARRIES • WINCHES • WINDLASSES

*FOR MATERIAL AID IN MATERIALS HANDLING* . . . . . **It's ROBINS**

# MESCO
## Insulator Switches



*This top view of the switch type No. 130 shows blade. It is a right hand switch with two hangers.*

• • •

WRITE FOR CATALOG NO. 44 SHOWING THE ENTIRE LINE OF MOSEBACH MINE SUPPLIES OR PHONE HEmlock 8332.

## DESIGNED TO WITHSTAND SEVERE SERVICE

**Mesco Insulator Switches are designed for long service under severe operating conditions and are built for greater safety.**

**All Mosebach Insulator Switches are constructed of high quality bronze in a variety of types to take care of practically any size trolley wire and feeder cable. Also made double blade for use in combination with feeder cables.**

## MOSEBACH ELECTRIC & SUPPLY CO.

1115 ARLINGTON AVE. PITTSBURGH 3, PA.



## NOW YOU TOO CAN ENJOY LONGER BEARING SERVICE

Specializing in bronze bearings and bushings for coal mining equipment, we give you a money-back guarantee of superior service. Promet assures you a specific formulae designed to best serve each application.

## PROMET BAR STOCK

(Cored or Solid)

Machines Easily

Rounds • Hexagons • Squares

Rough Cast
Semi-finished
Fully Machined

Cored bar stock in all sizes (by 1/8" steps) from a 1/2" minimum core to 12" O. D. and 12" lengths.

*Write for free descriptive booklet.*

PARTS FOR Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy Equipment, etc.

PROMET THE Engineered BRONZE

THE AMERICAN CRUCIBLE PRODUCTS CO.
1307 Oberlin Ave., Lorain, Ohio, U. S. A.

*Prompt deliveries can usually be made from stocks maintained at*

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| BECKLEY, W. Va., The Universal Supply Co., Corner 2nd Ave. and 2nd St. | Phone 1642 |
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| WILLIAMSON, W. Va., Williamson Supply Co. | Phone 1200 |

*Other Representatives*

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| ALTON, ILL., Frank E. Rhine, 623 Blair Ave. | Phone Alton 3-8624 |
| BIG STONE GAP, VIRGINIA | C. P. Cawood |
| BIRMINGHAM 1, ALA., D. O. Lindstrom Equipment Co. | P. O. Box 101 |
| CANTON, OHIO, Bowdil Company, Waynesburg Road | Phone 29-808 |
| MT. LEBANON, PA., J. E. Nieser, 720 Roselawn Ave. | Phone LE 9876 |
| DENVER, COLO., Urquhart Service, 36th Street at Elyke | Phone Main 0431 |


sizes for Cardox or Airdox tubes as well as for strip mining. The design of the bits is such that they maintain their gage throughout their useful life without over- or underdrilling of hole size.

The Kennametal tips in both cutter and drill bits are brazed onto alloy-steel stock and will withstand all the shocks or rough handling encountered in ordinary service. For maximum service the manufacturer prescribes reasonable care in handling and grinding, and to facilitate this grinding and thus lengthen service furnishes a special bench or stand grinder with two wheels for roughing and finishing. When handled and ground in accordance with recommendations, the number of regrinds is placed by the manufacturer at 25 or more in rock bits and 30 or more in drill or cutter bits in coal.

Kennametal augers are constructed of special rolled alloy-steel shapes twisted to provide a double spiral of uniform pitch with a solid center section. After rolling and twisting they are heat-treated for toughness and rigidity. The shanks for the augers are drop-forged of alloy steel (one-piece construction) and are heat-treated. Kennametal supplies special sockets for application to thread bars of all types of drilling machines. These sockets and shanks permit standardization of all drilling machines and complete interchangeability of augers (any auger can be used on any drill). The sockets and shanks permit augers to be changed with a twist of the wrist.

•

## Rust Solvent

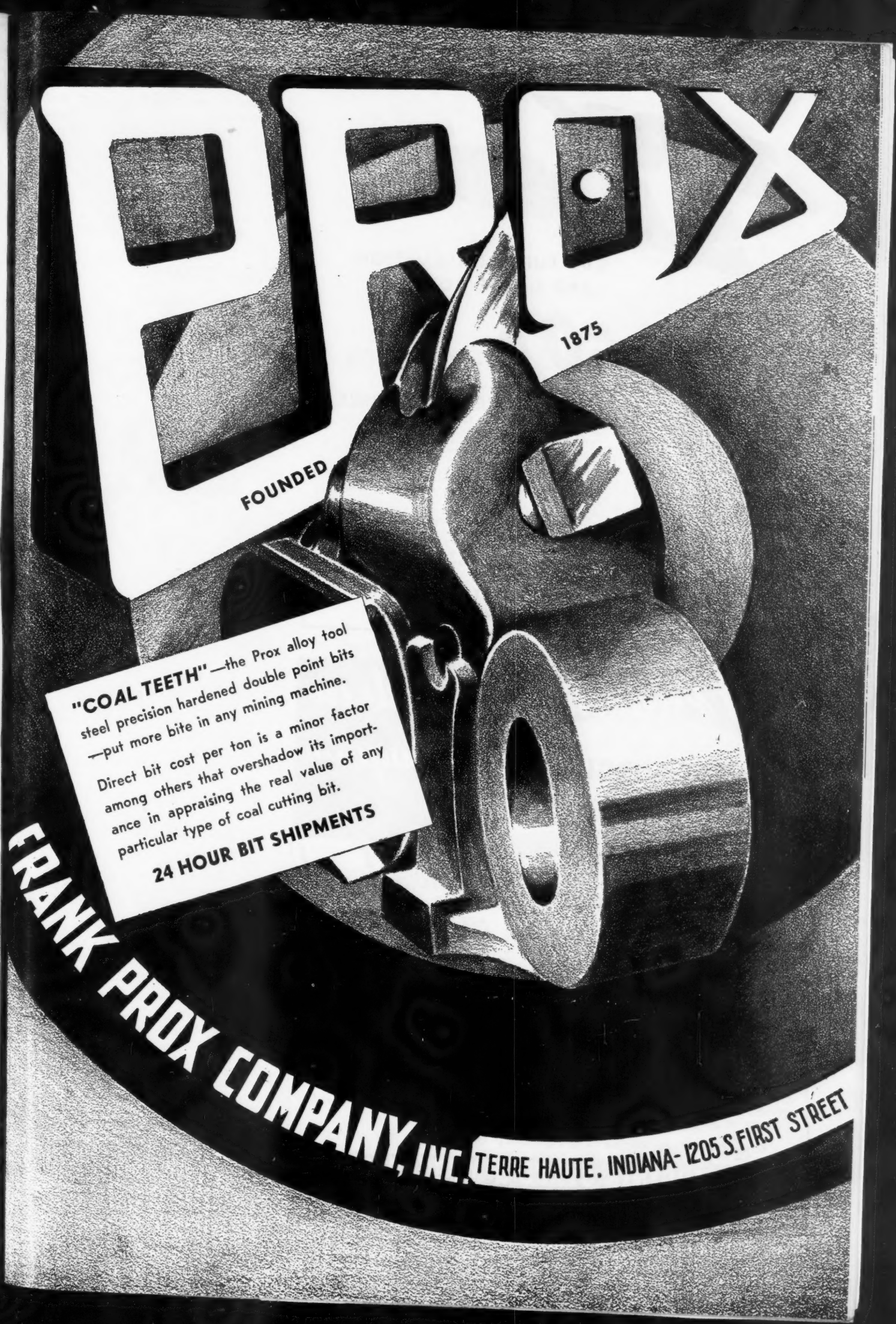
A new solvent for rust, CarboRustex, is offered by Carbozite Corp., First National Bank Building, Pittsburgh 22, Pa. Supplied only in concentrated form, CarboRustex is mixed with water in equal parts. The solvent is said to be non-imflammable, is applied by brush, spray or dip method, spreads readily and leaves no globules. A sufficient quantity of a chemical rust inhibitor, which is dissolved in water, is furnished. This solution is used to rinse the metal surface to protect it from oxidation for several days or until the surface can be permanently protected with a Carbozite protective coating.

•

## Anti-Freeze

Johnson-March Corp., 52 Vanderbilt Ave., New York 17, N. Y., offers Jomco anti-freeze, said to be based on an entirely new principle of freeze-prevention in coal whereby the excess water is driven away by increasing the rate of flow and waterproofing the surface, whereupon the retarded anti-freeze element begins to take effect on the remaining moisture. Because of this dual action, it is asserted, only about one-half of the Jomco anti-freeze material is required to give the same results, since a small quantity of water is present.

When the Jomco anti-freeze consisting of selected calcium-chloride particles surrounded by a protective coating of anti-wetting and oil-dispersing materials, comes

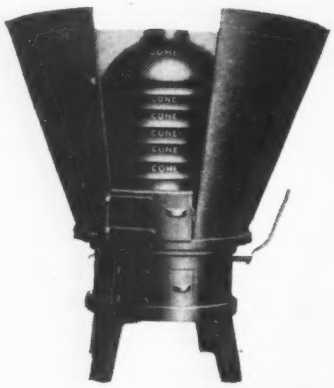

PROX
FOUNDED
1875
"COAL TEETH"—the Prox alloy tool steel precision hardened double point bits —put more bite in any mining machine.
Direct bit cost per ton is a minor factor among others that overshadow its importance in appraising the real value of any particular type of coal cutting bit.
24 HOUR BIT SHIPMENTS
FRANK PROX COMPANY, INC.
TERRE HAUTE. INDIANA- 1205 S. FIRST STREET

# DRY SAND

CUT FUEL CONSUMPTION AND LABOR COSTS BY

50% With PERFECTION

CONE STOVE SAND DRIERS



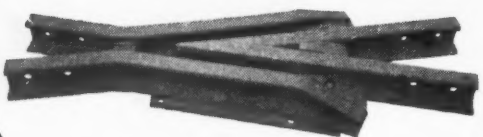
It requires only *half* as much labor and fuel to produce a ton of really *dry* sand with the PERFECTION Sand Drier . . . and in eight hours this Drier will produce from 8 to 10 tons of dry sand! It's obvious that with a PERFECTION Sand Drier you're assured plenty of dry sand to help locomotives pull today's heavier loads. Specify it now for your operations.

Write today for full information on this and the many other PRINCETON products. Our facilities include Pattern Shop, Machine Shop, Grey Iron and Bronze Foundries for the manufacture of a wide variety of mining parts and accessories.

Princeton FOUNDRY & SUPPLY CO.
Princeton, West Virginia

Coal Production Depends on Haulage . . .

"WEST VIRGINIA" Safety Frogs



. . . Haulage depends on Good Track!

KEEP CARS ON THE TRACK

Sharp turnouts are often a source of trouble in mine track—when ordinary trackwork is used—but here's a "WEST VIRGINIA" Safety Frog which keeps your hauling equipment on *the rails.*

*Look at its SAFETY FEATURES:*

DEPRESSED WINGS—prevent catching of dragging equipment.
HEEL RISER—prevents point splitting and acts as a foot guard.
THROAT BLOCK—prevents wedging of wings and acts as a foot guard.
FLARE BLOCKS—act as re-railers and foot guard.

*Write for full description of MODERNIZED TRACKWORK FOR MINES.*

WEST VIRGINIA STEEL & MFG. COMPANY
Formerly The West Virginia Rail Company
HUNTINGTON WEST VIRGINIA


in contact with the wet coal the anti-wetting element immediately starts to dissolve, attacks the excess water and literally drives it away from the coal, the maker declares. This dewatering element is stated to retard the deliquescence of the chloride particles until well after the excess water has drained from the car. The chloride, it is asserted, then combines with the remaining water and all of it remains in the car as a permanent anti-freeze protection.

•

## Face Shield

The new "Hundred" series of face shields, designed about the primary motif of comfort for the wearer, offered by the Boyer-Campbell Co., 6540 St. Antoine St., Detroit 2, Mich., has the characteristic of complete interchangeability of parts.



The "100," "200," "300" and "400" models are identified by a variance in design of headgear. For each model there is a choice of three different thicknesses and three different sizes of cellulose-acetate general-purpose windows—three different sizes of 24-mesh screen windows for heat protection and a fiber front for scarfing and welding.

•

## Industrial Notes

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has appointed A. J. Schmitz as Pacific regional manager. Frank Sullivan, a specialist in cement, crushing and mining machinery, has joined the sales staff in the Seattle office and E. J. Baireuther will be in the Denver office as a specialist in electrical apparatus and in cement, crushing and mining machinery.

LIMA LOCOMOTIVE WORKS, INC., Lima, Ohio, has appointed Paul R. Ehrgott as general sales manager of the shovel and crane division, in charge of domestic and export sales.

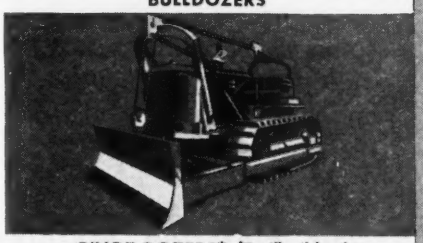
GOULD COMMERCIAL DIVISION, National Battery Co., Depew, N. Y., has appointed Leslie Eugene Howard as sales engineer for its Spokane and Salt Lake City territories. He will have headquarters in Spokane, where he succeeds N. R. Farsje, who has been transferred to Portland, Ore. A. J. Miller has been made a sales engineer for the Detroit district and will cover all of Michigan and western




"BULLDOZERS COME FIRST"—Just released by McGraw-Hill, this new 278-page book dramatically illustrates the prime importance of bulldozers and other construction equipment in winning the war against the Axis. Written by five of the country's ablest war correspondent editors, it's packed with facts and pictures gleaned from all the major battle areas.



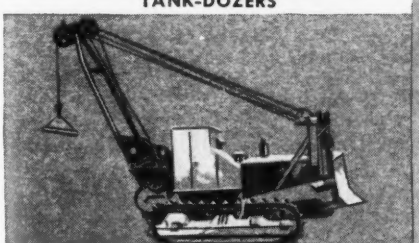
BULLDOZERS



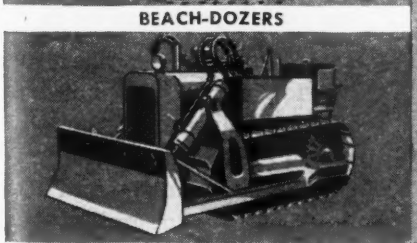
PIVOT-DOZERS* (*Trailbuilders*)



TANK-DOZERS



BEACH-DOZERS



CALF-DOZERS (*Airborne*)

# ....And LA PLANT-CHOATE *Comes first* IN BULLDOZERS!

## *Again in '44—LaPlant-Choate Built More Dozers for Essential Needs Than Any Other Company*

While detailed figures cannot be revealed because of military censorship, 1944 was *the biggest production year in dozer history*. Moreover, again this year LaPlant-Choate built more dozers for the armed forces and essential civilian users than any other company in the industry. In addition to thousands of cable and hydraulic operated bulldozers and Pivot-dozers*, LaPlant-Choate developed and built hundreds of highly specialized engineer units—including the now famous Tank-dozer, the Beach-dozer and the small airborne Calf-dozer. This record-breaking production, plus LaPlant-Choate's *21 years of "know-how" in dozer engineering is your* best assurance of tomorrow's best buys in dozer equipment. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

**LA PLANT-CHOATE**

*America's Oldest and Largest Manufacturer of Dozers*

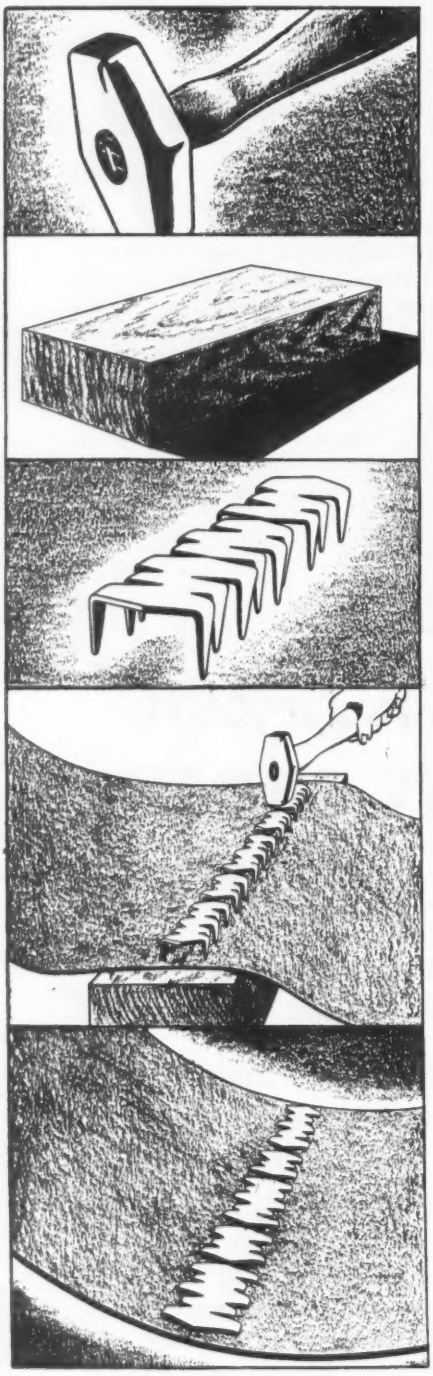
**Trade-mark applied for*

Note the three stars—LaPlant-Choate is one of the few companies in the construction equipment industry to have won the Army-Navy "E" award of merit—four times in a row.

ARMY E NAVY

**LA PLANT-CHOATE**

*Earthmoving and Land Clearing Equipment*



# BRISTOL'S BELT FASTENERS

For leather, rubber or woven belts and conveyors — up to 13/16". Write for Bulletin 728A.

THE BRISTOL COMPANY
139 Bristol Road, Waterbury 91, Conn.
DISTRIBUTORS EVERYWHERE

Ohio. C. P. Judge has been made divisional manager at Pittsburgh, succeeding S. E. Gane, who has formed his own company. Mr. Judge will have charge of sales in the western half of Pennsylvania, West Virginia, Kentucky and parts of Ohio and Indiana.

INTERNATIONAL HARVESTER Co., Chicago, has set up separate motor truck branches at several points where combination truck, farm equipment and industrial power branches formerly had been operated. These incluide Denver, Colo., I. A. Leimbrook, manager; Indianapolis, Ind., L. W. Hully, manager; Atlanta, Ga., C. S. DeWeese, manager; Kansas City, Mo., Buford Mullin, manager, and Louisville, Ky., E. M. Ford, manager.

UNITED STATES RUBBER Co., Rockefeller Center, New York City, has agreed to purchase the assets and business of the H. L. Gilmer Co., Tacony, near Philadelphia, Pa., manufacturer of industrial V-belts. The oldest firm of rubber-fabric belting specialists in the United States, Gilmer owns the world's largest assortment of V-belt folds. It has a plant containing 130,000 sq.ft. of floor space and has 700 employees. U. S. Rubber also has appointed Herman A. Everlien as general sales manager of the mechanical goods division and Walter F. Spoerl as merchandise manager, both newly created positions. James E. Power has been named as eastern sales manager of the mechanical goods division.

DR. PAUL W. LEPPLA, formerly chief chemist of the research division of Cardox Corp., Chicago, has been placed in charge of the company's electrochemical activities. DR. JOHN L. GRING succeeds Dr. Leppla as chief chemist of the research division. Formerly with the General Electric Co. at its Pittsfield (Mass.) plant, Dr. Gring will be associated with Dr. Charles A. Getz, vice president in charge of research for Cardox Corp.

RELIANCE ELECTRIC & ENGINEERING Co., Cleveland, Ohio, has elected Clarence L. Collens, for 37 years president, to the newly created post of chairman of the board and is succeeded in the presidency by James W. Corey, sales vice president since 1940. Announcement also is made of the resignation, effective at the year's end, of H. M. Hitchcock, senior vice president and treasurer. He will remain a director. A. M. MacCutcheon, engineering vice president, has been elected to fill Mr. Hitchcock's place upon his retirement. C. V. Putnam retires after 38 years with the company, to be succeeded as secretary by Roscoe H. Smith, who will continue his duties as head of the sales promotion department.

BALL AND ROLLER BEARING INFORMATION CENTER, representing the entire antifriction bearing industry in America, has recently been formed, with headquarters at 16 East 48th St., New York 17, N. Y.

TIMKEN ROLLER BEARING Co., LTD., Canadian subsidiary of the Timken Roller Bearing Co., of Canton, Ohio, has arranged to build a new bearing and rock-bit



# Speaking of CONCENTRATION

In metallurgy, concentration is the process by which the values — the concentrates — are segregated from the ore and made available for processing. Hundreds of mills throughout the world entrust that job to AGITAIR.

## Agitair Flotation Machine

**recovers values by agitating the pulp and thus creating innumerable small bubbles. The bubbles capture the concentrates and are peeled off, the valuable mineral cargo being discharged to launders. The machine's rubber-covered, cone-shaped impeller forces the air in a downward direction, producing intense aeration and agitation at the cell bottom, the unique feature of AGITAIR so highly important in the treatment of ores.**

## Agitair Flotation Machine

**is simple and easy to regulate. Its three-point adjustment—pulp depth, froth depth and air volume—insure highest efficiency and maximum profit from the operation.**

Write for a free copy of our profusely illustrated bulletin covering all details of the principle, the mechanism and the multiple-cell adaptability to volume of AGITAIR.

**"THERE IS NO SUBSTITUTE FOR EXPERIENCE AND SERVICE"**

THE GALIGHER COMPANY
48 SOUTH SECOND EAST
SALT LAKE CITY, UTAH

# FOR TOUGH GATHERING JOBS



## The Austin Brownie Perfect Oiler Pump

High heads, acid water, silt, long suction lines, pumping water from several sumps, handling air and water alternately—these are conditions under which Austin Pumps have been working successfully for over twenty years.

Austin-Brownie Perfect Oiler Pumps are made in four sizes, rated from 35 to 100 g.p.m., and for heads up to 250 ft. Water cylinders are of cast iron bronze fitted, all high lead acid resisting bronze, or chrome iron.

The 6x6 pump illustrated is mounted on a sled type base with V belt drive between motor and countershaft. The power frame is fully enclosed, equipped with anti-friction bearings, and all working parts are oil bath lubricated. Overall dimensions height 28½", width of base 27", length 8' 9".

For conditions that lick ordinary pumps—specify Austin Brownie.



TURTLE BACK STRAINER —For use on suction lines of all gathering pumps. Made in 2" and 3" sizes, of cast iron, bronze, or chrome iron.

## Other Brown-Fayro Specialties

BLOWERS, MINE CARS, CAR SPOTTERS, RERAILERS, RETARDERS and WHEELS, HOISTS, SHEAVES.

THE BROWN-FAYRO COMPANY
JOHNSTOWN, PENNA

QUALITY MARLO PACKING

METALLIC & SEMI-METALLIC
**PACKING**
*for*
**MINE PUMPS**

***"The Packing that gets the Repeat Orders"***

For deep mine pumps. Resists acid mine waters. Keeps grit out of stuffing box. Three types.

**• MARLO ALL PURPOSE METALLIC PACKING**

Best ever devised. Will not freeze at 70° below. Soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

**• "TWIN-TWIST" SEMI-METALLIC PACKING**

Metal strands twisted with asbestos. Anti-frictional. Durable. Economical. Remarkable compressability. Never hardens. For temperature up to 550° F.

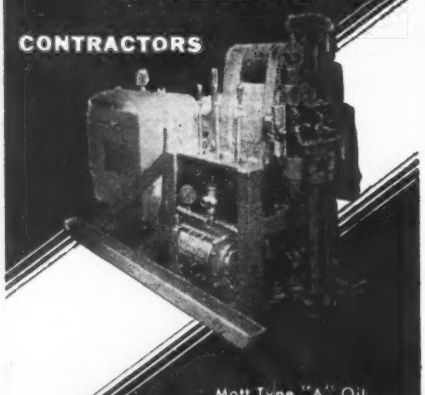
**• "RED WATER" SEMI-METALLIC PACKING**

Most modern development for all hydraulic applications. A solid-packing vegetable fibre combined with metal strands. Retains form under any conditions.

***Let us serve you***

**THE MARLO COMPANY**
38 HOWARD ST.
NEW YORK, N. Y., U. S. A.

**MOTT**
**DIAMOND CORE DRILLING**
CONTRACTORS



Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¼" Diameter Core.

• Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts. ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

**MOTT CORE DRILLING CO.**
HUNTINGTON • WEST VIRGINIA

plant in St. Thomas, Ont., on a 75-acre plot purchased from the city on the east side of Talbot St., served by six railroads.

TRUMBULL ELECTRIC MFG. CO., Plainville, Conn., announces that George L. Stout, recently appointed representative in the Cleveland district, has been made manager of that district. C. F. Latham, former manager, has been transferred to the New York office.

R. G. LETOURNEAU, INC., Peoria, Ill., has appointed Eugene E. Weyeneth and Joseph G. Van Loo as manager and assistant manager, respectively, of the firm's advertising department, and Robert G. Prince as manager of the training department. The trio succeed George C. McNutt, advertising manager for the last decade, who resigned Nov. 15 to return to California, and A. R. Thomson, who left the company on the same date to become associated with Lyle Hosler, advertising, in Peoria.

VULCAN IRON WORKS, Wilkes-Barre, Pa., has appointed H. R. Pittman as treasurer, vice W. W. Moss, resigned. With the company 27 years, Mr. Pittman lately has been assistant secretary and assistant treasurer.

WOOD SHOVEL & TOOL CO., Cincinnati, Ohio, has appointed as general manager E. H. Branning, recently head of Hardware and Tools Procurement Division of Army Service Forces.

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## Trade Literature

V-BELTS—B. F. Goodrich Co., Akron, Ohio. Folder explains and pictures construction of the wire grommet V-belt and outlines its particular usefulness in handling tough transmission problems.

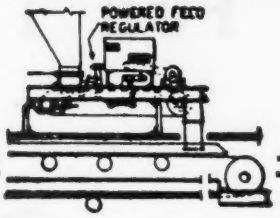
CLAMPS AND FITTINGS—B. F. Goodrich Co., Akron, Ohio. Bulletin Form 108E describes Punch-Lok clamps and fittings for many purposes, giving pictorial descriptions, accompanied by test, of the many clamps and fittings, together with tables giving information on all sizes. Tools used in applying them also are described.

FLASHLIGHT BATTERY—B. F. Goodrich Co., Akron, Ohio. Catalog Section 12030 outlines the development of the rechargeable wet storage battery for flashlights built on the same principle as the automobile storage battery as the answer to the expendable dry-cell problem where flashlights are in constant, heavy service.

WELDING ELECTRODES—Page Steel and Wire Division, American Chain & Cable Co., Inc., Monessen, Pa. Book on Page-Allegheny stainless steel welding electrodes includes, in addition to suggestions on how to select the proper electrode for welding stainless steels, much information on welding procedures and recommendations.

TANK-TYPE LOCOMOTIVES—Vulcan Iron Works, Wilkes-Barre, Pa. Bulletin A-394 is devoted especially to saddle and side-tank locomotives for general indus-

**MERRICK**




**FEEDOWEIGHT**
*Accurately Feeds and Records by Weight*

**Look into this method of feeding coal to a mixing conveyor.**

**A powered feed regulator controls the feed gate. A visible balance indicator shows true balance for correct rate of feed, while the weight totalizer keeps an accurate record of the day's tonnage.**

**Investigate this sturdy, dependable equipment for controlling and recording by weight.**

***Write for Bulletin 551.***

**Merrick Scale Mfg. Co.**
Passaic, N. J.

**HERCULES AUGERS**

**Hercules Augers**

Ideal for modern high speed electric drills—withstands whips and torsional strains. Flint hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

**Black Diamond Augers**

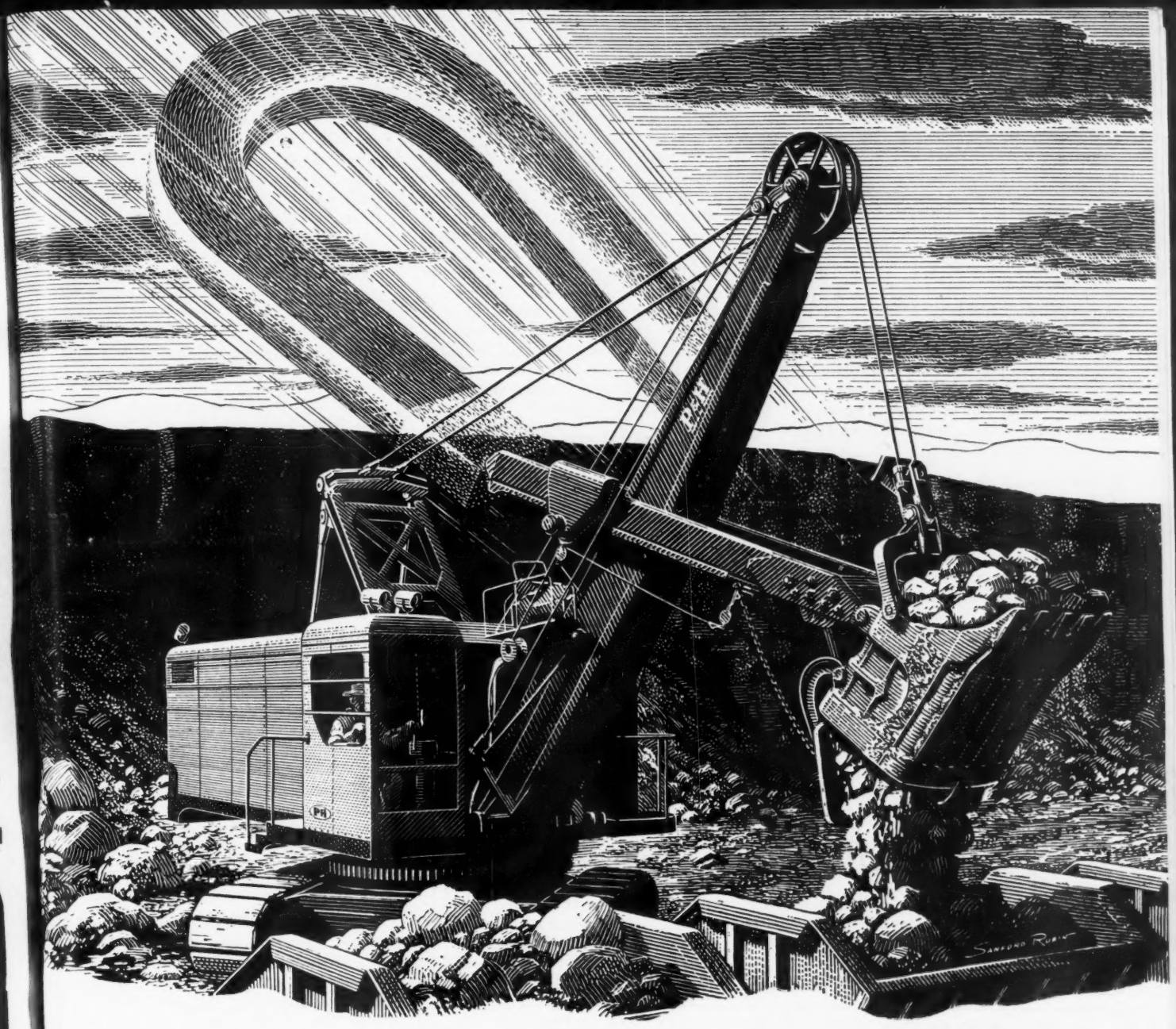
Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

**Standard Augers**

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel, 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or 'phone for details concerning sizes, prices, deliveries, etc.

**SALEM TOOL COMPANY**
SALEM OHIO



# ow We Harnessed a Magnet to Eliminate Wear

Where there is no mechanical contact between moving parts, no wear can take place. This is the principle which P&H uses to transmit power for hoisting the dipper of the new P&H Electric Shovel. . . . The *Magnetorque Drive* transmits torque by electro-magnetic forces rather than by mechanical contact. Designed specifically for Electric Shovel operation, it eliminates motor commutation problems, sliding gears, mechanical clutches and other complicated mechanisms. Reversing the hoist motor is no longer necessary. Hoisting is completely independent of all other operations.

The *Magnetorque Drive* is typical of the advanced engineering and simplicity embodied in every detail of the new P&H Electric Shovel. Write for full information about the new P&H Electric Shovels.

**P&H**

**ELECTRIC SHOVELS**

4540 W. NATIONAL AVE.
MILWAUKEE 14, WISCONSIN

**HARNISCHFEGER**
CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS | P&H | HOISTS • WELDING ELECTRODES • MOTORS

GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT

trial and plantation service, though it also describes and illustrates tender-type as well as diesel and gasoline units with either geared or electric drive.

FEEDER-WEIGHER-CONVEYOR—Schaffer Poidometer Co., Pittsburgh, Pa. Catalog details construction, operation, equipment, attachments and uses of the Schaffer Poidometer for automatic weighing of crushed, granular and pulverized materials. Listed are a number of coal dryer installations.

SAFETY FLOORING—Goodyear Tire & Rubber Co., Akron, Ohio. Bulletin describes Griptred, a non-slip surfacing material, its uses, and methods of preparing surfaces and making installations to insure safe, sure-footed surfaces.

V-BELTS—B. F. Goodrich Co., Akron, Ohio. Handbook cites operating advantages of V-belt drives, with pointers on what to look for in a V-belt, general information on installation and care, as well as service factors, general belt-selection table and horsepower ratings.

PRECISION INSTRUMENTS—Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa. Folder ENT (7a) briefly describes all L&N products for regulating plant processes. One section covers instruments for measuring by four pyrometric methods: thermocouple, rayotube, thermohm and optical. For other plant processes, equipments that measure such quantities as pH, speed, gas analysis, etc., are described. A large chart shows the particular instrument model available in each case—installation illustrations show the equipments in service. Another section is devoted exclusively to a discussion of heat-treating furnaces, with a page describing and illustrating each method: vapocarb-hump hardening, homocarb carburizing, homo nitriding and homo tempering. Also described, in still another section, are laboratory instruments long used in industry. And there is a description of equipments widely used for increasing power-plant efficiency.

ARC-WELDING ELECTRODES—Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin gives a complete description of each electrode in the A.-C. line, also including separate charts on physical properties of weld metal for each electrode as well as on recommended current values.

TIRES—B. F. Goodrich Co., Akron, Ohio. Operators' handbook is filled with pertinent data on each of the tires the company makes for commercial service. The data are condensed and follow the description of the individual tire itself. A comprehensive index increases reading ease. A section dealing with the eight factors that affect tire life lists them as: loads carried, air pressure, speed, matching of duals, load distribution, rims, size and condition, wheels, brakes and springs, and how the vehicle is driven. Under each of these chapters the booklet discusses conditions that may be found in truck operation and then tells exactly what can be done to correct the faults that are wasting tire miles. Another chapter gives instructions on how to mount synthetic tubes correctly and the application of synthetic tubes and flaps. Tube, valve and flap data for all size tubes are included as well as recommended practice for rims and dual spacings.

ACETYLENE GENERATOR—Air Reduction Sales Co., 60 East 42d St., New York 17, N. Y. Bulletin features the new Airo Type P portable generator. The company's complete line is described, including portable models in 15-, 30- and 50-lb. sizes with 30, 60 and 100 cu.ft. maximum hourly productive capacity. Stationary models are available in 300- and 500-lb. sizes that deliver 300, 600 and 1,000 cu.ft. maximum hourly production.

CARBON BRUSHES—Superior Carbon Products, Inc., 9115 George Ave., Cleveland 5, Ohio. Folder cites coal mines among users of Superior carbon brushes impregnated with silver on jobs from heavy-duty motor and generator service to light fractional horsepower jobs. Description includes table of characteristics.

TRUCKS—Euclid Road Machinery Co., Cleveland 17, Ohio. Booklet J-100, "Production With Rear-Dump Euclids," describes and depicts these units in use for heavy haulage in culm-bank recovery, coal-mine refuse disposal, removing overburden in strip mining, etc.

ANTI-FREEZE—Johnson-March Corp., 52 Vanderbilt Ave., New York 17, N. Y. Folder describes Jomco anti-freeze dual compound for winterizing coal. It is asserted that it aids dewatering and then protects against freezing.

DISTRIBUTION BOX—Ohio Brass Co., Mansfield, Ohio. Bulletin 780M describes features and advantages of the O-B Type LG permissible distribution box (250 and 550 volts, d.c.) for the operator whose mechanized underground mining system requires the concentration of several portable electrically operated machines in a small area offering a method of connecting such machines to the power source in a safe, approved manner.

COAL CUTTERS—Jeffrey Mfg. Co., Columbus 16, Ohio. Catalog 780 depicts Series 29 coal cutters—track, crawler and pneumatic-tire mounted—describing their characteristics and emphasizing outstanding features.

TACHOMETERS—Jones Motrola Co., Stamford, Conn. Bulletin 44-1, describing four models of individual-mount tachometers and a multi-range portable hand tachometer, shows both full-face and profile views, r.p.m. ranges available, mounting dimensions and includes prices for tachometers and appurtenances, a section on use and operation, and general installation data.


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*ENGINEERS AND BUILDERS OF MODERN COAL OPERATION*
Authoritative Valuations and Reports of Mining Properties, Equipment and Operation.
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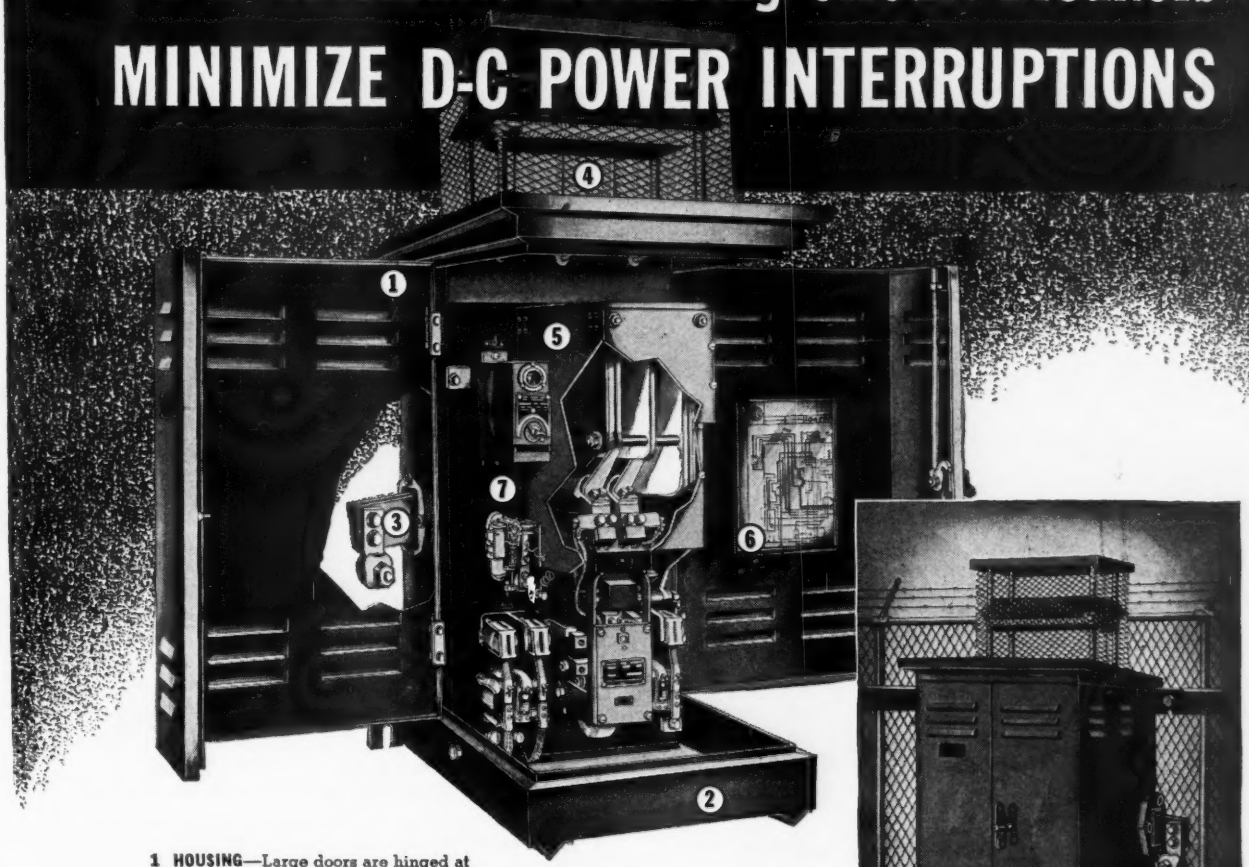
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30 Years
Continuous Consulting Service to Coal Mines
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Oliver Building—Pittsburgh, Pa.

# I-T-E Automatic Reclosing Circuit Breakers
# MINIMIZE D-C POWER INTERRUPTIONS






**1 HOUSING**—Large doors are hinged at rear of mounting panel, giving plenty of room for inspecting breaker when they are opened wide. Housing is weatherproof.

**2 BASE**—Heavy fabricated base forms a solid support and the circuit breaker may be simply set on the ground. Runners permit moving breaker when this becomes necessary. Straps allow pole mounting if desired.

**3 CABLE CONNECTIONS**—Incoming and outgoing cables are located on each side at the rear. Connection bars slope downward from breaker and bushings are weatherproof. Solderless cable connectors are provided to speed installation.

**4 RESISTOR**—Bridging resistor is part of load measuring relay circuit that detects whether a fault exists and when breaker may be reclosed automatically. Screen housing provides full protection and ventilation.

**5 HOOD**—Hood protects circuit interrupting parts but is quickly removed for inspecting arc chute and contacts. Contacts are also readily removable using ordinary tools.

**6 WIRING DIAGRAM**—Wiring diagram is conveniently located in a holder with transparent plastic cover inside door. Always clean but ready for immediate use.

**7 RELAYS**—Relay equipment including load measuring and automatic reclosing control is provided to suit each installation.

These breakers are used to prevent unnecessary or needlessly prolonged interruptions to vital operations in mines or wherever continuous d-c power service is important.

When applied to sectionalized tie-lines as an independent, stub end feeder, tie-feeder or multiple fed circuit breaker, only the section in which trouble occurs is out of service; others continue to operate. Furthermore, a load-measuring relay "feels" the circuit continuously after the breaker has opened and, when the overload or short circuit conditions have been corrected, the breaker recloses automatically. Power is restored without needless delay.

Ask your nearest I-T-E representative or write to I-T-E Circuit Breaker Company, 19th & Hamilton Streets, Philadelphia 30, Pa., for illustrated Catalog 2502 which describes in detail the I-T-E Automatic Reclosing Circuit Breaker and its applications.

I-T-E

*Representatives In All Principal Cities*

ARMY E NAVY

AIR SWITCHGEAR

# THERE'S ONLY ONE REASON

## for Rewiring Mining Equipment

## with ROCKBESTOS A.V.C. MINING CABLE

# It Keeps Tonnage UP!




Cutter, loader and locomotive internal cable-failures can and do slow up coal production . . . but it's a failure that you can keep down, often eliminate, by rewiring with a cable that stands up under the toughest operating conditions . . . Rockbestos A. V. C. Mining Cable. Its tough *permanent* impregnated asbestos insulation is built to take it without breaking down under heat, moisture, oil, grease, and alkalies. It won't bake brittle, dry out, crack, bloom, swell or rot . . . and it's safe because it won't burn or carry flame. That's why Rockbestos A.V. C. is used and recommended by leading equipment builders and mine electricians.

To keep your mining equipment up-at-the-face producing . . . use Rockbestos A. V. C., the heatproof, flameproof mining cable . . . for connections between controllers and resistors, coil connections and motor leads. For sample and literature, write:

**Rockbestos Products Corporation, 1102 Nicoll St., New Haven 4, Conn.**

### THE ORIGINAL A.V.C. CONSTRUCTION

**1** Flexible tinned copper conductor, perfectly and permanently centered in helically applied insulation.

**2** Paper separator makes stripping easy; prevents insulation from sticking to conductor.

**3** Felted asbestos insulation, impregnated with heat, flame and moisture resisting compounds, withstands conductor heating overloads and won't dry out, bake brittle or burn.

**4** Varnished cambric for high dielectric strength and added moisture resistance, protected from heat, flame and oxidation by two felted asbestos walls.

**5** Outer felted asbestos wall, also impregnated with heat, flame and moisture resistant compounds, serves as an effective barrier against high ambient temperatures and flame.

**6** Heatproof, fireproof asbestos braid, resistant to moisture, oil, grease and alkalies, is diametered to properly fit bushings.

For sizes and diameters refer to McGraw-Hill Mining Catalogs or write to Rockbestos Products Corporation, P. O. Box 1102, New Haven 4, Conn.

*122 different wires and cables have been developed for severe operating conditions by Rockbestos.*

# ROCKBESTOS A.V.C.

## *The Cable with Permanent Insulation*

**ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."**

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| BECKLEY, W. VA.: | Beckley Mach. & Elec. Co. | EVANSVILLE, IND.: | Evansville Elec. & Mfg. Co. | PITTSBURGH, PA.: | Upson-Walton Co. |
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**FOR VICTORY — GET OUT COAL and INVEST IN U. S. WAR BONDS**

# For Coal Stripping - -

# EUCLIDS are your Best Bet!





Rear-Dump and Bottom-Dump Euclid Coal Haulers move more tons per hour at consistently lower cost because they are designed and built throughout for off-the-highway service. Carrying pay loads of 15 to 30 tons at top speeds of 21 to 34 m.p.h., Euclids are efficient for all lengths of haul. Low operating and maintenance costs plus dependable trouble-free performance has made Euclid the outstanding equipment for hauling coal, heavy overburden and breaker refuse.

If you need hauling equipment for a current job or are planning now for replacements, be sure to consult your Euclid distributor or write us direct for detailed information.

## THE EUCLID ROAD MACHINERY CO., Cleveland 17, Ohio



**EUCLID** SELF-POWERED HAULING EQUIPMENT For EARTH . . ROCK . . COAL . . ORE



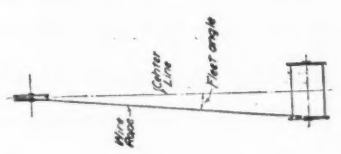

# Two on the Aisle at the Beach-Head Bijou

The empty rope reels our fighting men sometimes use in their improvised theatres can mean but one thing . . . that our engineers are using plenty of tough, dependable wire rope in the operation of cranes, shovels, draglines and bulldozers.

Add to these demands the requirements of the industries providing supplies for our fighters, and it's easy to see that in spite of greater production there still isn't enough Wickwire Spencer Wire Rope to meet all demands.

To help conserve wire rope we suggest that you send for copies of our book, "Know Your Ropes," which is packed with ideas to help make wire rope last longer. And, when you do need rope, get WISS-COLAY *Pre*formed. It not only lasts longer than the non-preformed, but it's easier to cut, splice and install; it's kink-resistant and safer to handle.

If you have a particular wire rope problem our wire rope engineers will be happy to be of service. Write Wickwire Spencer Steel Company, 500 Fifth Ave., New York 18, N. Y.




PROPER SHEAVE LOCATION LENGTHENS ROPE LIFE

Increasing the distance between the main sheave and the drum will reduce side wear of the rope. This and 39 other wire rope life savers; 78 "right and wrong" illustrations; 20 diagrams and charts—are all in our 82 page book, "Know Your Ropes."

SEND FOR YOUR FREE COPY

*Send your wire rope questions to:*

**WICKWIRE SPENCER STEEL COMPANY**

500 FIFTH AVENUE, NEW YORK 18, N. Y.

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● *Built by La-Del Conveyor & Mfg. Co.*

# Moving Coal Fast

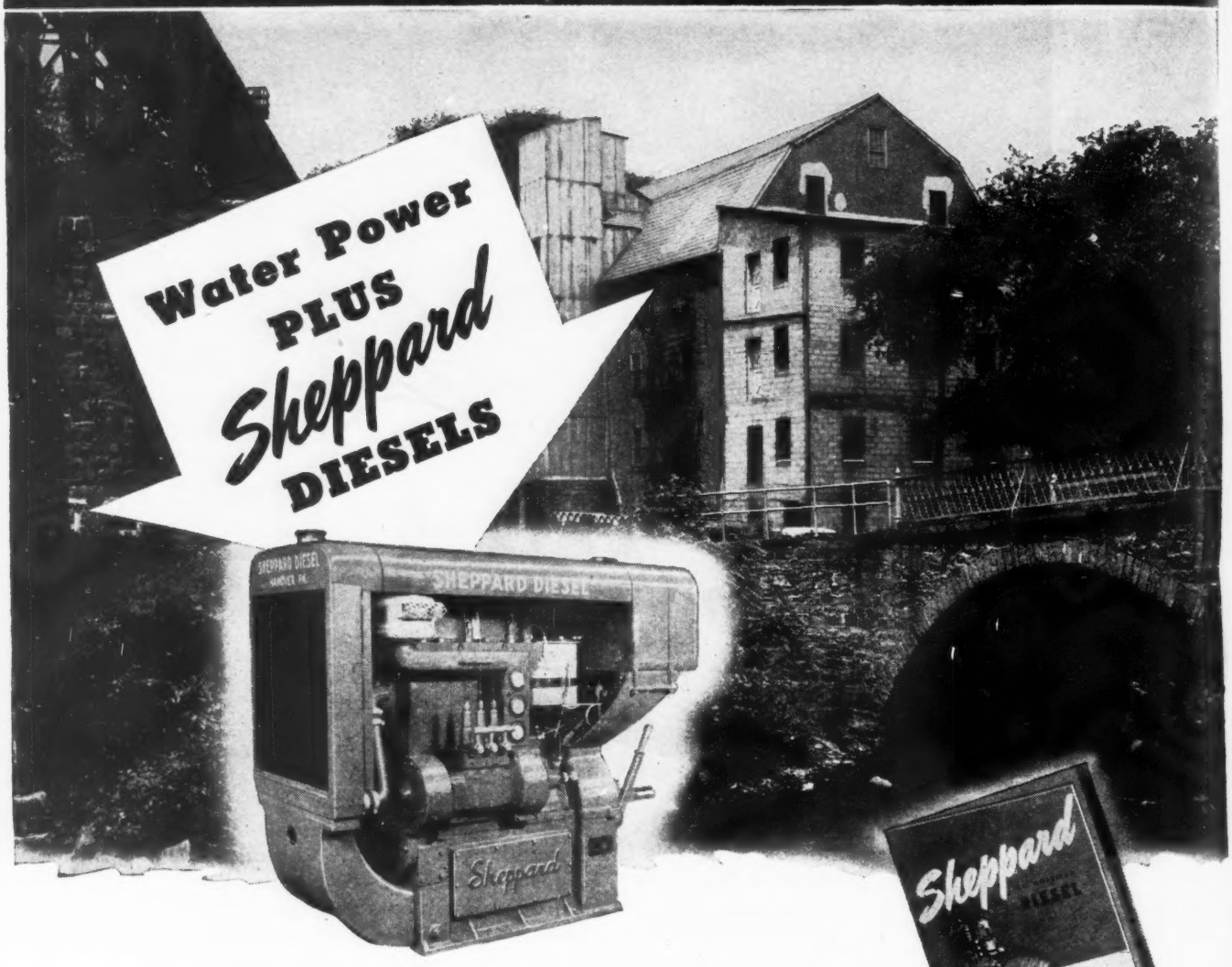
From working face to car, a stream of coal flows *continuously* on this La-Del Shaking Conveyor. And on the drive and ball carriage, SKF Bearings combine correct alignment with freedom from adjustments and the ability to take heavy loads without binding. They need only occasional lubrication for year-in-and-year-out performance. A few of the many advantages that make SKF's preferred not only for conveyors, but for cars, screens, crushers, fans—every machine that works in a coal mine.

5691

SKF INDUSTRIES, INC., PHILADELPHIA 34, PA.



## GRAPHITE MILL USES WORLD'S THRIFTIEST POWER COMBINATION



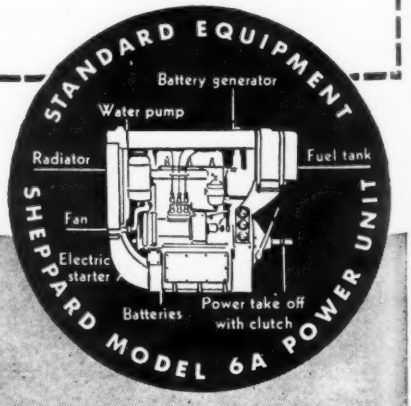

WATER POWER is economical... but unreliable. This graphite mill supplements water power with four Model 6 Sheppard Diesels which take over when water level falls or the stream freezes up. The combination feeds a steady supply of low cost power to the mill's machinery at all times. Despite the severe service conditions created by the constant presence of graphite dust, the Sheppard Diesels are always "ready to go."

Complete dependability and readiness to go into action at any minute are assured by Sheppard Diesel's oil cooled pistons...hardened, replaceable cylinder liners... 4% governor regulation... simplified fuel injection system.

If you want to learn how low in cost dependable power can be, learn about Sheppard Diesels. Some of these engines are now available on priority to essential industries. Sheppard engineers will be glad to make recommendations suited to your present or post-priority needs. Write today, stating your requirements.

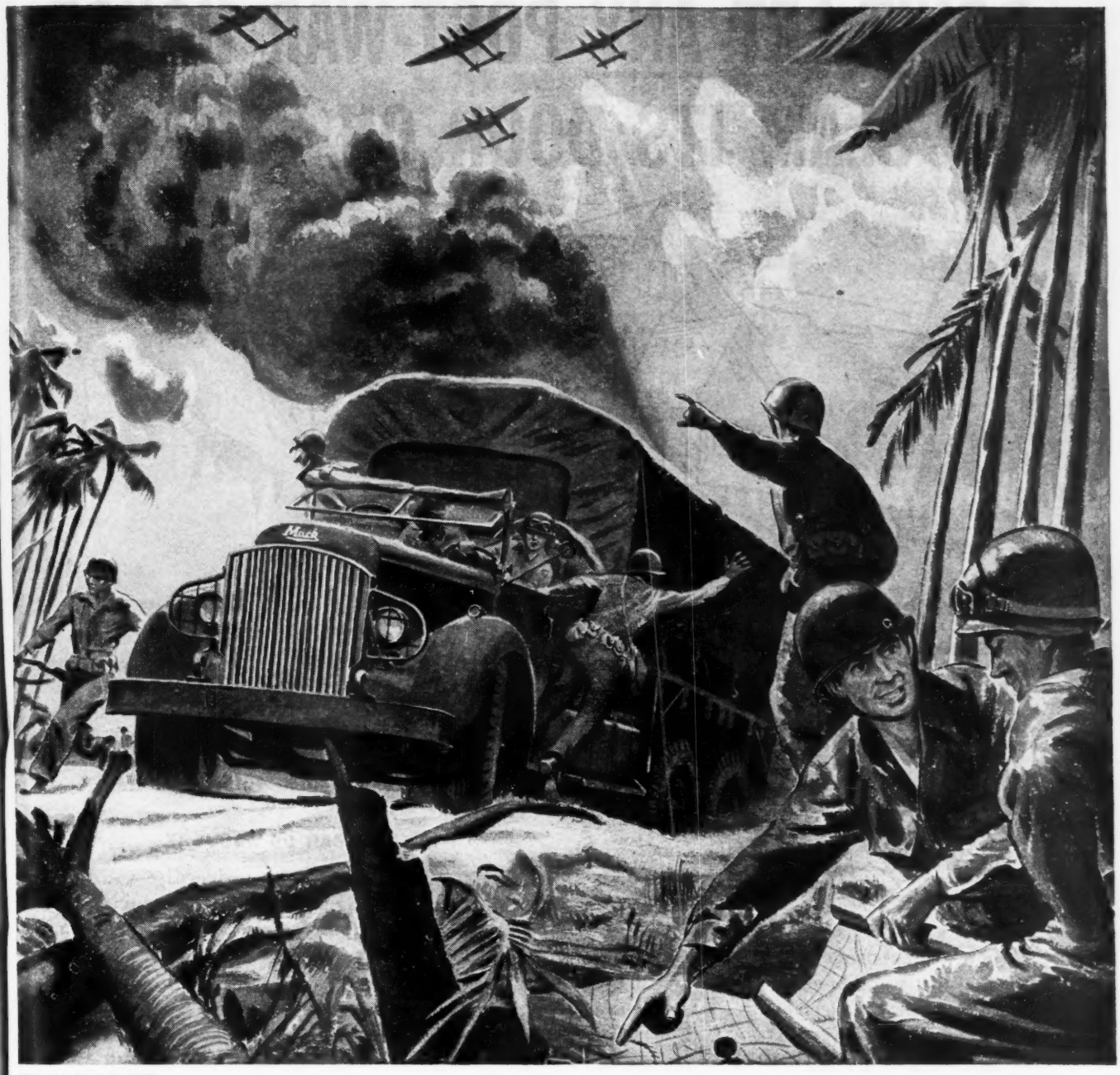



**SHOWS WAY TO CUT GENERATING COSTS.** Handy, file-size folder . . . just published . . . gives valuable information about Sheppard Diesel Generating sets. Compact . . . time-saving . . . no pages to leaf through ! Quantity is limited . . . so write for your copy today.




R. H. SHEPPARD COMPANY, HANOVER, PA.

# Sheppard
ALL AMERICAN
DIESELS




COPR. 1944 MACK MFG. CORP.

## *SOMETHING YOU CAN'T CAMOUFLAGE . . .*

Our army can paint a Mack or any other truck to hide it from enemy eyes. But nothing about a truck can be camouflaged from its driver. That fact sent thousands of men home from the front after World War I to become Mack boosters. And this time Macks are even better! . . . Returning service men will know what you mean when you use the words "built like a Mack" to describe something tough and dependable.




*Mack Trucks, Inc., Empire State Bldg., New York City. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.*



**Mack**

**TRUCKS**
**FOR EVERY PURPOSE**
ONE TON TO FORTY-FIVE TONS

*BUY U. S. WAR BONDS*

**IF YOU'VE GOT A MACK, YOU'RE LUCKY . . . IF YOU PLAN TO GET ONE, YOU'RE WISE!**

# DON'T LET ANY POST-WAR HOUSE SLAM ITS DOOR ON YOU!



**. . . Protect your Bituminous Coal business locally! Join the Industry's nation-wide campaign for Adequate Chimneys**

● Every day, more and more people are planning new post-war homes. Whether they realize it or not, many of these new home-builders are planning to *shut you out* of their houses for all time—by building *chimneys too small for Bituminous Coal heat!*

That's a serious threat to your business. And it's a real danger to the long-range value of the post-war homes to come. The future of other fuels is uncertain. For many reasons they can skyrocket in cost.

But—and it's a big "BUT"—there is so much Bituminous Coal in this country that there is no doubt it will continue to be the most economical fuel for generations to come.

*No new home should be built without a chimney big enough to burn Bituminous Coal!*

Leaders in the coal industry have seen this business threat—are acting to remove it. In home-makers' magazines and architects' magazines, the industry is urging home-planners nationally to build Adequate Chimneys—chimneys big enough to handle Bituminous Coal.

**WHAT YOU CAN DO ABOUT IT**

Here's a great opportunity to increase your business prestige, render a real community service and *protect the future of your business!* Take advantage of it!

Write to us today. Get the eight major methods to "sell" Adequate Chimneys to your community. Find out exactly who to contact and how to win their support. Ask us for the consumer material which you can use to great advantage. Sign the coupon below . . . and help protect the future of your business!

**BITUMINOUS COAL INSTITUTE, 60 EAST 42ND STREET, NEW YORK 17, N. Y.**

CLIP THIS COUPON

BITUMINOUS COAL INSTITUTE,
Department J
60 East 42nd Street, New York 17, N. Y.

I am interested in protecting future Bituminous Coal sales in my community. Please send me complete information, including a sample consumer folder. No obligation.

Name_____

Company_____

Address_____

City_____ State_____

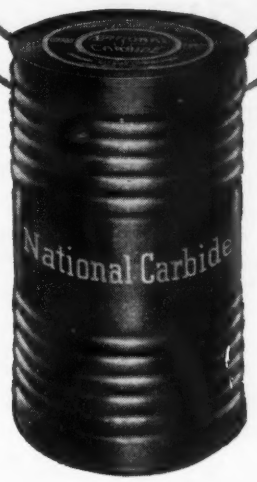
MAIL IT TODAY!

*(NOTE: This advertisement is one of a series appearing in coal dealer publications. If you would like more information about this campaign, write to the above address.)*

# Rates "TOPS" with Industry

## for these 3 important reasons

NATIONAL (TRADE MARK) CARBIDE

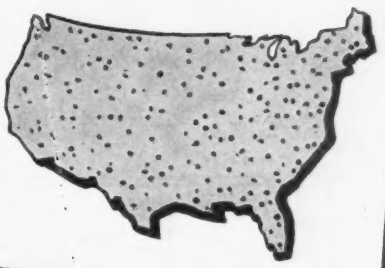



You can depend on National Carbide—the famous "carbide in the red drum". More than a quarter century of widespread use has established the economy, uniformity and productivity of this quality carbide.

National Carbide is available in all sizes for generator use—packed in standard size drums. For the address of your nearest National warehouse or distributor, write to Air Reduction's New York office, Dept. CA

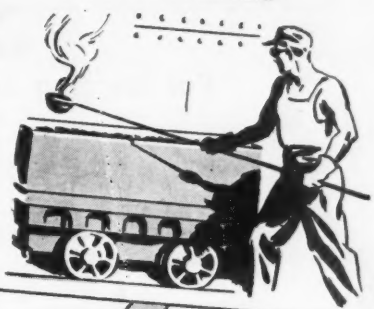
### 1. NATION-WIDE LOCAL DISTRIBUTION

Prompt deliveries in large or small quantities from more than 250 warehouses located in or near all major manufacturing centers. Also supplied by local dealers and distributors.



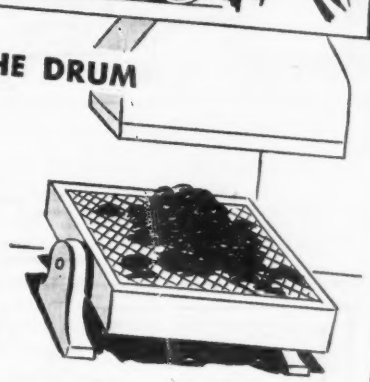
### 2. HIGH ACETYLENE YIELD ASSURED

Hourly testing and the use of exceptionally fine quality materials and strictly-controlled manufacturing procedures, produce a carbide practically free from impurities.

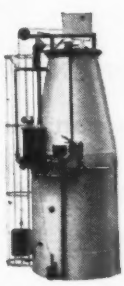


### 3. DUST-FREE IN THE DRUM

Because National Carbide is screened with extreme care. It is carefully packaged under strict supervision in air-tight drums in order to prevent contamination and deterioration.



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For dependable volume production of acetylene, use National Carbide in Airco Acetylene Generators. Five sizes to choose from—15 lb., 30 lb., 50 lb., 300 lb. and 500 lb. single or double rated. The first three sizes are portable types and the latter two are stationary. These generators are listed by the Underwriters Laboratories, Inc. Write to Air Reduction's New York office for descriptive folder ADC 619, Dept. CA.

AIRCO

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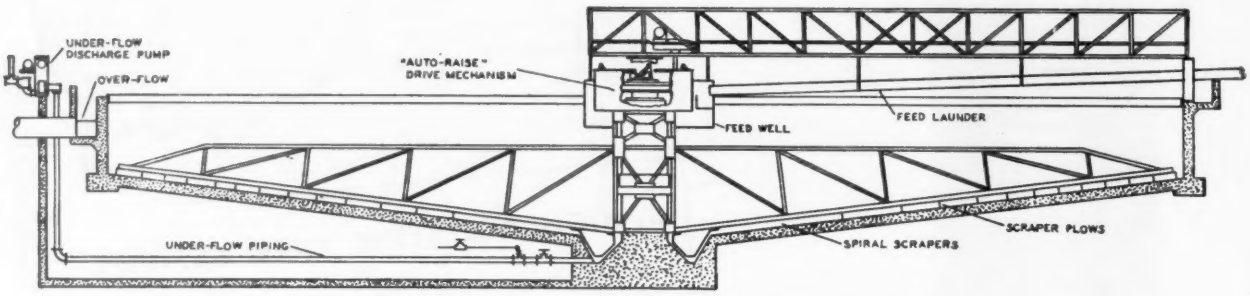
General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

In Texas: MAGNOLIA AIRCO GAS PRODUCTS CO. • General Offices: HOUSTON 1, TEXAS

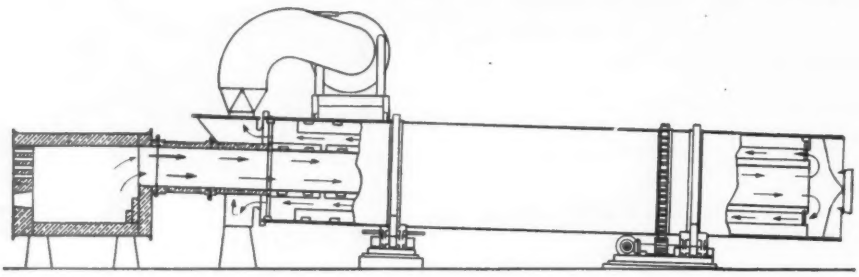
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# Coal Preparation Equipment

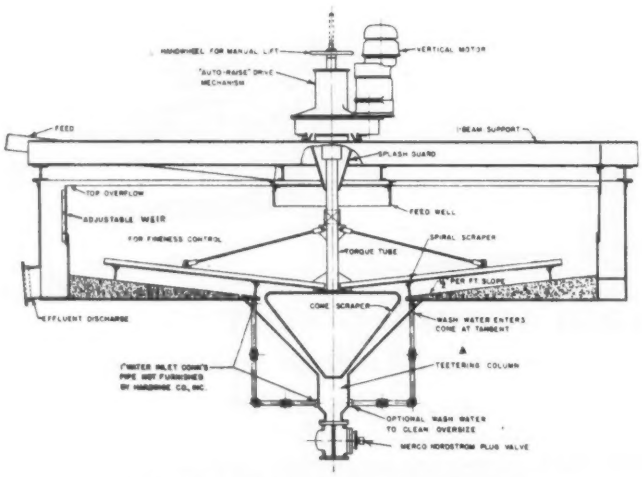
## Classifying
## Thickening
## Drying
## Feeding



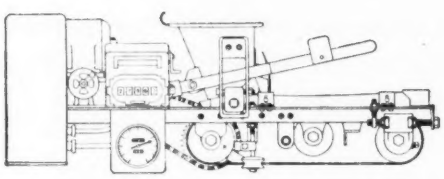

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For treating breaker water and preventing stream pollution.



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**"RUGGLES-COLES" DRYER**
The double shell dryer of high thermal efficiency.




**HARDINGE HYDRO CLASSIFIER**
For the recovery of fine coal.



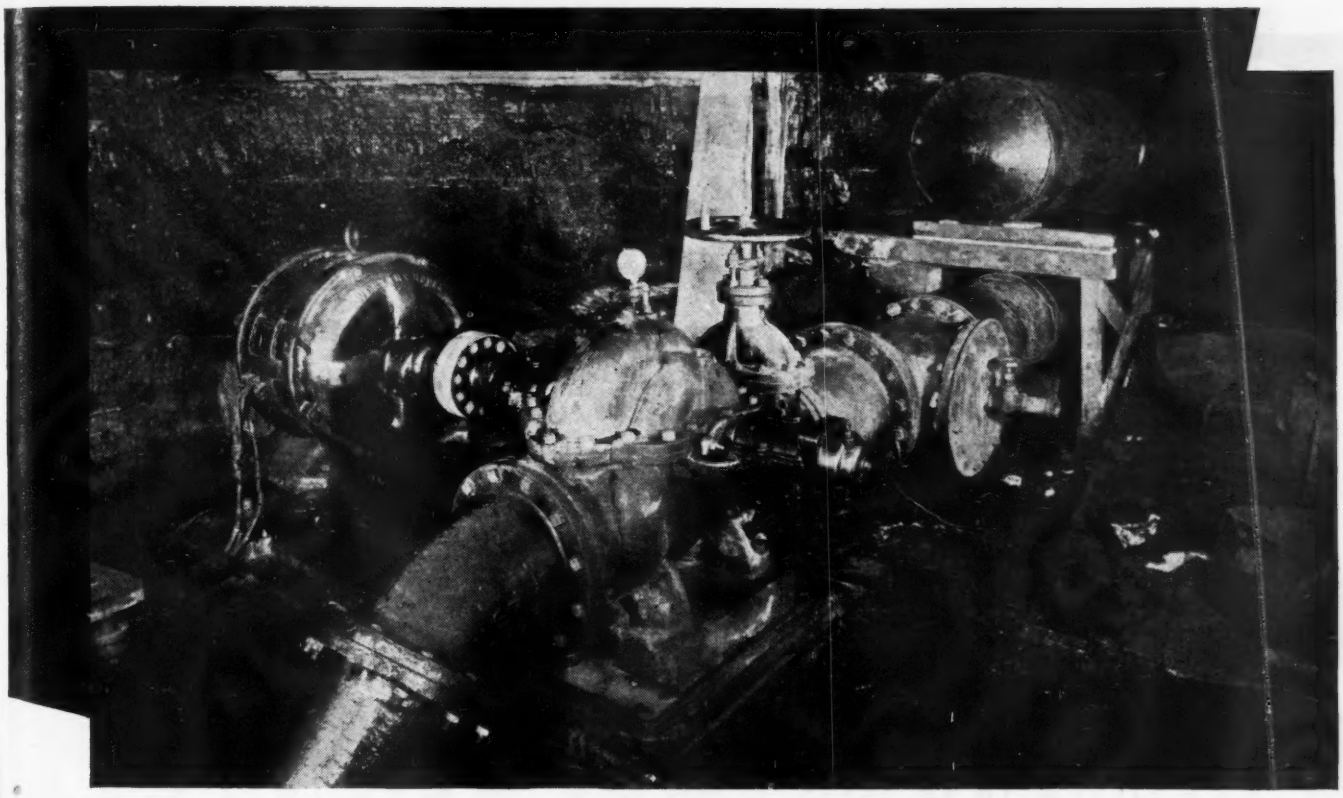
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For proportioning two or more sizes of coal. Indicates and totalizes weight fed.

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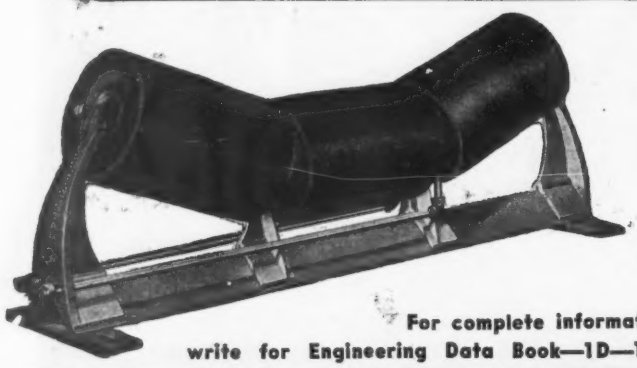
**For complete specifications and ratings on this and other Warren Pumps, send for Bulletin 227-1.**

ARMY E NAVY

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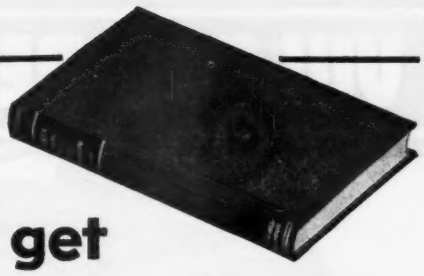
Flexco HD Rip Plate



Flexco HD Belt Fastener

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FLEXCO HD BELT FASTENERS
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# How to get peak coal production

## *from your mechanical-loading equipment*

Here are the most efficient methods of using various types of loading machines, conveyors, scrapers, and certain special equipment, in the loading and handling of coal underground, now presented in a readable, thorough, and practical treatment.

# Mechanical Loading of Coal Underground

*By* IVAN A. GIVEN
EDITOR, *Coal Age*

**397 pages, 6 x 9, 222 illustrations, $4.00**

THIS practical manual thoroughly discusses the various types of equipment used in slope sinking, entry-driving, and development work, and in production of coal from the usual or regular working sections—details the methods suited to or used with the various types of equipment and under various seam thicknesses and natural conditions—tells how machines are best installed, where they can fill in for other types of equipment, what to do to get biggest production from equipment.

Included in this sound book are over 200 necessary maps, plans, and sketches, showing how methods described in the text are practically applied to actual working conditions. A liberal number of mining plans tested in given mines throughout the country are here, as well as the latest thought on face, reparation, power supply and maintenance.

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- —every possible way in which equipment can be used
- —how to keep equipment in first-class running order
- —what factors to consider in purchasing mechanical-loading equipment
- —when a small investment in simple attachments saves the purchase of an entire new machine
- —installation considerations for all equipment
- —methods for increasing mining extraction etc., etc.

### CONTENTS


1. Mechanical-Coal-loading Principles
2. Mechanical-Coal-loading Essentials
3. Types of Mechanical loading Units, Characteristics, Crews, Unit production—Hand-loaded Equipment.
4. Types of Mechanical-loading Units, Characteristics, Crews, Unit Production—Self-loading Equipment.
5. Slope-sinking and Development with Mechanical-loading Equipment
6. Conveyor-mining Plans
7. Scraper-mining Plans
8. Mobile-loader Mining Plans
9. Face Preparation
10. Power for Mechanical Loading
11. Maintenance in Mechanical Loading



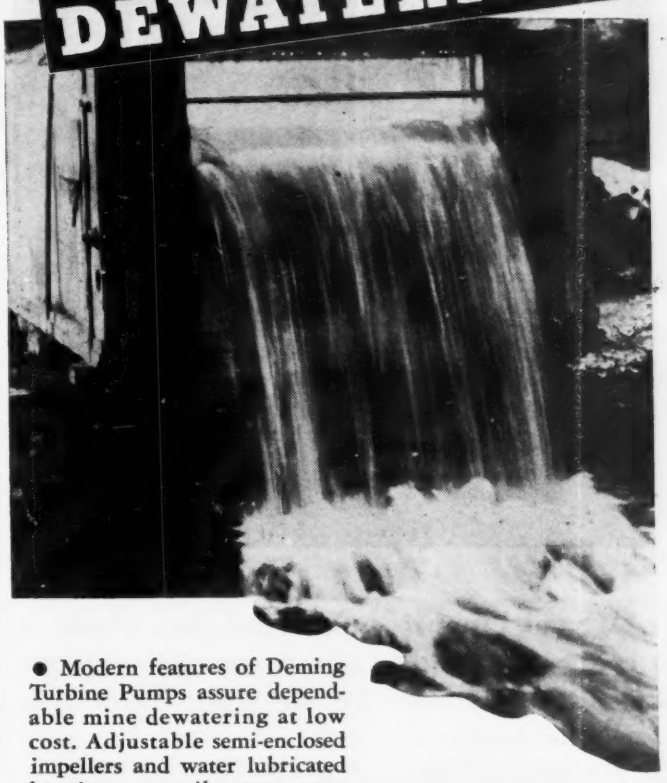
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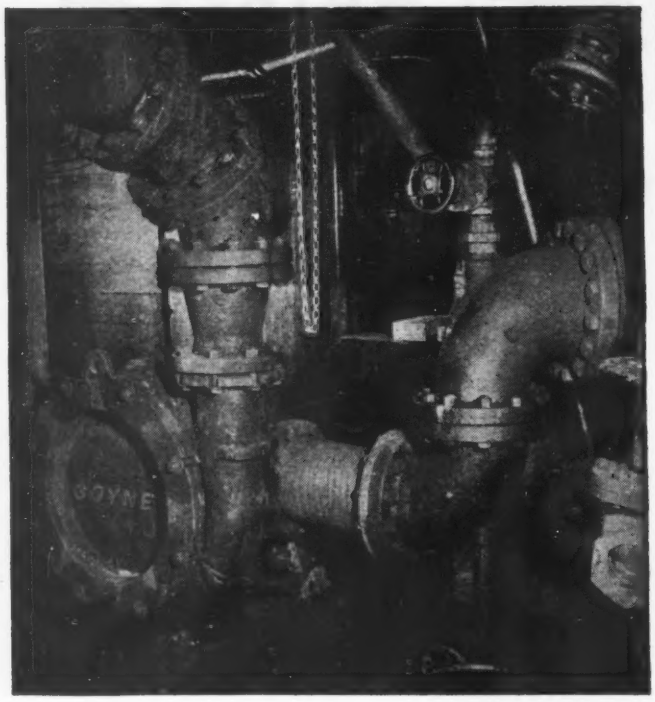




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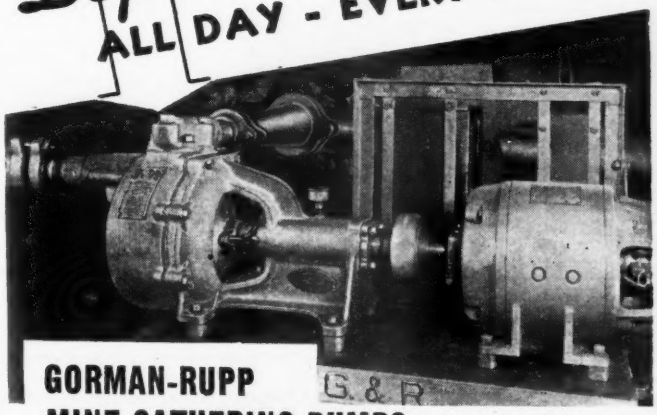

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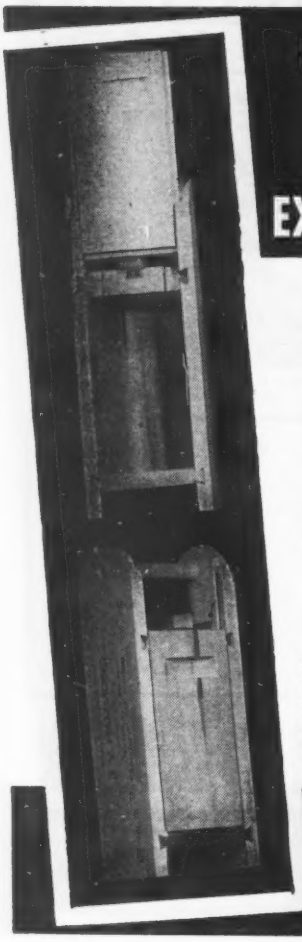
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*Latest Type*
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Boxes are constructed entirely of wood, having no metal parts. They are of tongue-grooved and dovetailed construction, having handle for carrying, and are equipped with automatic lock using rubber bands for a spring.

NOTE: There are NO metal parts . . . conforming to regulations of the Penna. Dept. of Mines.

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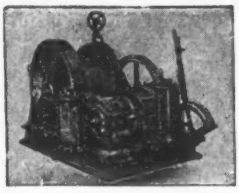


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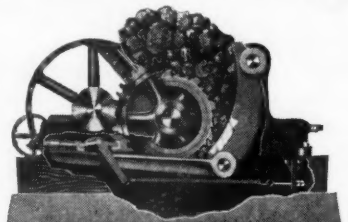
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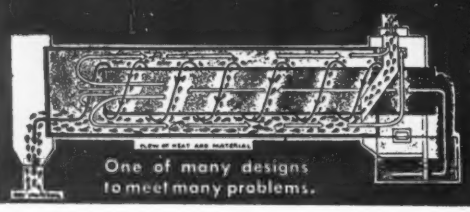
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# SEARCHLIGHT SECTION

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P-282, Coal Age
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### POSITIONS VACANT

WANTED:—DRAGLINE operators, for Page, Monighan, and Cat draglines. Stripping coal. Must have coal stripping experience. Give full history of experience, giving names of firms employed by, length of time employed, and class of machines worked on. Morgan Coal Company, 19 West 38th Street, Indianapolis 8, Indiana.

MINING COMPANY that has had continuous operation for the past twenty years desires to employ competent Mine Boss who has had experience in mechanized mining. Must be familiar with conveyor equipment and Mobile Loaders. Salary commensurate with production ability. P-283, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

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*Address copy to the Departmental Staff*

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3—10-ton Goodman
4—8-ton General Electric
5—6-ton General Electric
8—6-ton Goodman

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Several 3, 4 and 5-track complete Steel Tipples.

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Must be good condition and priced right. Would consider other makes.

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1— 5 ton, W-1-2, 36".
2— 5 ton, 2600 K.
1— 6 ton, 33-1-4-T.
2— 8 ton 32-1-4-T.

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Bar steel frames 10 ton, 6 ton, and 4 ton.

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6 ton 801
8 ton 839
Battery Locomotives GE., Ironton and Atlas:

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**Jeffrey,** 35B and 4—28A, 250 V. 4—29B, 29C, 29CE with shearing head.

**Goodman,** 12A, 12AB, 12AA, 12G3A, 24B
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA.
2—124EJ.

**Sullivan,** CE7, CE9, CE10, CR10 Low Vein. CR5 for middle cutting.

## SUBSTATIONS—275 volts, D. C.

2—200 KW **G.E.** Rotaries (600 volt).
2—150 KW **West.** Rotary.
1—200 KW 1—100 KW **Ridgway** M-G Sets
1—100 KW **West.** M-G Sets.
2—100 KW **G.E.** Rotary.
1—100 KW **Allis-Chalmers** Rotary.

## SPARE ARMATURES

**Jeffrey** MH 110, MH 78, MH 73, 29B, 35B and 28A. **Goodman** 34B, 30B, 30C, 12A, 12AB, 12AA 33-1-4-T, 31-1-4-T. **General Electric** 801, 803, 819, 821, 825, 839. **Westinghouse** 904, 906, 102, 907, YR2, 115. Also 200 KW **Westinghouse Rotary Converter Armature,** 250 V. Bracket Type, 150 KW G.E. HCC Bracket Type, and 150 KW G. E., TC Pedestal Type.

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## GUYAN MACHINERY COMPANY, Logan, W. Va.

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### GENERATORS

1—100-KW G.E. type TC-6 Rotary converter complete with 2300 volt transformers and switchboard, 250 volt D.C.
1—100-KW Westinghouse, type SK-180 generator complete with switchboard.
1—62½ KVA A.C. generator with 100-HP. natural gas engine complete with switchboard.

### LOCOMOTIVES

1—10-Ton Jeffrey MH-110, 250 volt, 44" gage.
1—10-Ton Jeffrey MH-78, 250 volt 42 or 44" ga.
1—8-Ton Westinghouse, type 65, 250 volt, 44" ga.
1—4-Ton G.E. 826, 44" gage 250 volt, low vein.

### CUTTING MACHINES

1—212-AA Goodman, 500 volt comp. with truck
1—12-AB Goodman, 500 volt with low vein truck
1—35-A Jeffrey, 250 volt, less truck
1—29-B Jeffrey arcwall, 250 volt, 29-C motor

### MISCELLANEOUS

25-HP Single drum hoist with A.C. motor
50-HP Single drum hoist with A.C. motor
1—5 x 8' Double deck vibrating screen (Fairmont)
250—44" gage mine cars, 30" high
100—44" gage mine cars, 22" high

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## MINE HOISTS

1—Vulcan Keyed drum 30" dia. Will coil 2500 ft. ¾" rope. 50 HP Motor.
1—Vulcan Band friction 42" dia. Will coil 3000 ft. 1" rope. 100-HP Motor.
1—Flory Keyed drum 52" dia. with 150 HP Motor.
1—Vulcan Man Hoist. 72" dia. Suitable 300 ft. shaft. Motor to suit conditions.
1—Nordberg Shaft Hoist. 72" dia. 150 HP Motor.
1—Vulcan Cylindro Conical Shaft Hoist. 7'-9'—350 ft. wire rope. 400 HP Electrical Equipment.
1—Lidgerwood Two-Drum tail rope haulage hoist. Will coil 9000 ft. 1" rope. 300 HP Motor.
1—Ottumwa haulage hoist. 84" dia. Will coil 10,000 ft. ⅞" rope. 400 HP Motor.
1—Wellman Haulage Band Friction. 96" drum 10,000 ft. 1¼" rope. 700 HP Electrical Equipment.

***And other hoists to suit all mining conditions.***

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1—Ottumwa double drum, single gear reduction Electric Shaft Hoist, complete, in first-class condition, with 60 horsepower, 600 revolutions, 220 volt, 3 phase, 60 cycle General Electric motor.

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1—6-Ton Gas Locomotive, 36" Ga., Milwaukee Locomotive Works
1—9-Ton Gas, 36" Ga., Whitcomb
2—25-Ton 0-4-0 Porter Saddle Tank Locos. Oil Burners: A.S.M.E. Code, Excel. Cond.
1—30-Ton, 0-4-0 Mack Diesel Electric Locomotive
1—35-Ton, G.E. Electric Loco., 250 volt, D.C.
2—43-Ton Baldwin-Westinghouse Electric Locomotives, 600 volt D.C.
1—50-Ton 0-6-0 Vulcan Locomotive
1—60-Ton Westinghouse Electric, 550 V. D.C.
1—65-Ton 2-6-0 Mogul Loco. Oil-burning
1—70-Ton 0-6-0 Baldwin Switching ICC cond.
1—70-Ton Gas-Electric Locomotive
1—70-Ton G.E. Battery Electric Excel. cond
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Other Locomotives, Too

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**16 YD. DRAGLINE:**
1—16 Yd. Electric Caterpillar Modern Dragline with 160' Boom
**AIR COMPRESSORS:**
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
(12") Belted, 360, 676, 870, 1000, 1300 ft.
(12) Diesel 105, 315, 520, 676 & 1000 ft.
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(14) Gasoline, 10, 160, 220, 210 & 370 ft.
**RUBBER CONVEYOR BELTS:**
1000' 60", 600' 30", 300'' 20", 1000' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14"
**TANKS:**
12,000 and 15,000 gal. and 20,000 gal.
**CONVEYOR PARTS:**
Idlers, Heads & Tail Pulleys, Steel Frames, Tripper, etc., 14 In., 48 In. Large stock here.
**STORAGE BATTERY LOCOMOTIVES:**
2½ ton Whitcomb 24 ga. New Batteries
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3—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
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8—6 ton Baldwin Westgh. 42 ga. & 36 ga.
**TRACK SCALE:**
150 Ton Buffalo 56 ft. R.R. Track Scale
**TROLLEY LOCOMOTIVES:**
2½ ton Westinghouse 24 ga.
4—6 ton & 3—5 ton Goodman 36 ga.
3—6 ton Goodman 30 ga.
4—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
2—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey
**VIBRATING SCREENS:**
9 Tyler Hummer 3x6, 4x5, 4x8, 4x10
2 Robins Gyrex 4x8½
4x12 Niagara, 3x8 L. B., 5x6 Simplex
**CARS:**
60—Western 16-20-30 yd. Side Dump
**SHOVELS, CRANES & DRAGLINES:**
2 yd. Monighan 60' Boom Walker
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**WANTED TO BUY:**
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250/275 V. D.C.—3/60/2300 V. A.C.
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ARMATURE REWOUND—ALL REBUILT
COMPLETE PANEL CONTROL
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**CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED**

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**ABRASIVE RESISTANT COVERS**

| Width | Ply | Top-Bottom | Covers | Width | Ply | Top-Bottom | Covers |
|---|---|---|---|---|---|---|---|
| 48" | 8 | 1/8" | 1/16" | 20" | 5 | 1/8" | 1/32" |
| 42" | 5 | 1/8" | 1/16" | 20" | 4 | 1/8" | 1/32" |
| 36" | 6 | 1/8" | 1/16" | 18" | 4 | 1/8" | 1/32" |
| 30" | 6 | 1/8" | 1/16" | 16" | 4 | 1/8" | 1/32" |
| 30" | 5 | 1/8" | 1/16" | 14" | 4 | 1/16" | 1/32" |
| 24" | 5 | 1/8" | 1/32" | 12" | 4 | 1/16" | 1/32" |
| 24" | 4 | 1/8" | 1/32" | | | | |

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**TRANSMISSION BELTING**
**HEAVY-DUTY FRICTION SURFACE**

| Width | Ply | Width | Ply | Width | Ply |
|---|---|---|---|---|---|
| 18" | 6 | 10" | 6 | 6" | 5 |
| 16" | 6 | 10" | 5 | 5" | 5 |
| 14" | 6 | 8" | 6 | 4" | 5 |
| 12" | 6 | 8" | 5 | 4" | 4 |
| 12" | 5 | 6" | 6 | 3" | 4 |

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**ENDLESS "V" BELTS**
"A" WIDTH All Sizes | "D" WIDTH All Sizes
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**FIRE HOSE**
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| Size | Length | Per Length |
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| 2½" | 50 feet | $28.00 |
| | 25 " | 16.00 |
| 3" | 50 " | 23.00 |
| | 25 " | 13.00 |
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SPECIAL OFFER . . . HEAVY DUTY
**RUBBER HOSE**
**WATER HOSE**
Each Length with Couplings Attached

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| ¾" | 25 feet | $4.25 |
| 1" | 50 " | 8.00 |
| | 25 " | 6.25 |
| 1¼" | 50 " | 12.00 |
| | 25 " | 7.50 |
| | 35 " | 10.50 |
| | 40 " | 12.00 |
| 1½" | 50 " | 15.00 |
| | 25 " | 10.00 |
| | 35 " | 14.00 |
| | 50 " | 20.00 |

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|---|---|---|---|
| ½" | 25 feet | $5.00 | $1.50 Pair |
| | 50 " | 10.00 | 1.50 " |
| ¾" | 25 " | 6.25 | 2.50 " |
| | 50 " | 12.50 | 2.50 " |
| 1" | 25 " | 10.00 | 3.50 " |
| | 50 " | 20.00 | 3.50 " |

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5—12 DA 50 HP 250 v. Goodman Shortwall
35 B Jeffrey 250 v. 6' cutter
12 A Goodman 250 v. 36" Ga. 35 HP

**STORAGE BATTERY LOCOMOTIVES**

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors. Type LSBE Class 2C6 From C9. 13½' long, 50" high, 69" wide and 44" Wheel base. Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.

2—5 to 5½ Ton Type D Ironton, 36 or 42" Ga. Low Type, with Exide Battery.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
4 Ton 36" Ga. Atlas, with Exide Battery.
4 Ton 36" G.E. (2 motors), with Exide Battery.

**(Haulage)**

13 Ton Westgh. 250 V. 36" or 40" Ga.
10 Ton Jeffrey 500 v. 36/42" Ga.
1—5 Ton West. 250 V. 36 or 42" Ga. with Electric Gathering Reels. Bar steel frame.
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.
13 Ton Westgh. 500 v. 40" Ga.
2—6 Ton G.E. 500 v. 42/44" Ga.
2—6 Ton G.E. 250 v. 42/44" Ga.

**SCREENS**

2—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

**MG SETS 3 ph. 60 cy. (Syn.)**

200 KW G.E. 250 v.—2300/4000/3/60 900 RPM 40% P.F.
150 KW G.E. 250 v.—2200/3/60 900 RPM.
100 KW Ridg—250 v. DC—2200/3/60 AC 1200 RPM.
100 KW West. 125 v. DC—2200/3/60 AC 1200 RPM.
90 KW G.E. 250 v.—220/440/3/60 600 RPM Belter sq.cg.
90 KW G.E. 250 v.—2200/3/60 900 RPM

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100 KW 250 v. DC Westgh.—Skinner Engine.
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Turbine.
50 KW West. 125 v. DC—Skinner Engine.

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| 31 | 7½ | " | " |
| 28 | 10 | " | " |
| 2 | 25 | 2200 | 244/488 |
| 3 | 50 | 22000 | 2200 |
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**CAPACITORS**

180 KVA 2200/3/60 Type OH1 3 ph. 60 cy.

**DC GENERATORS**

150 KW West. Type S, 250 v. 450 RPM.
2—90 KW G.E. 250 v. 1000 RPM Type CL
75 KW G.E. DLC 125 v. 700 RPM.
50 KW West. 250 v. 900 RPM.

**SLIP RING & SQ. CG. MOTORS**

| HP | Make | Speed | Wdg. | Type |
|---|---|---|---|---|
| 500 | G.E. | 450 | S.R. | MT 414 |
| 200 | G.E. | 250 | S.R. | MT 412 |
| 200 | G.E. | 600 | S.R. | I-M |
| 150/75 | West. | 580/290 | S.R. | CW |
| 150 | West. | 375 | S.R. | CW |
| 150(2) | West. | 600 | S.C. | CCL |
| 125 | Al. Ch. | 435 | S.R. | |
| 100 | G.E. | 500 | S.R. | MI-25 cy. |
| 100 | Al. Ch. | 575 | S.R. | |
| 100 | G.E. | 1200 | S.C. | |
| 75 | West. | 580 | S.R. | CW |
| 75 | West. | 290 | S.R. | CW |
| 75 | West. | 850 | S.C. | CCL |
| 40 | West. | 875 | S.C. | CS |
| 50 | G.E. | 900 | S.R. | IM |

Other sizes down to 1 HP

**DC MOTORS—230 VOLTS**

| HP | Make | Speed | Wdg. | Type |
|---|---|---|---|---|
| 175 | G.E. | 475 | ser. | MD 109½ |
| 100 (3) | G.E. | 700 | cp. wd. | CL 90 |
| 130 | G.E. | 550 | ser. | CO 1812 A |
| 100 | G.E. | 480 | ser. | MD 108 |
| 60 | G.E. | 600 | ser. | CO 2507 |
| 25 | West. | 600 | cp. wd. | SK 130 |
| 25 | Reliance | 850 | cp. wd. | 185 T |

**SYNCHRONOUS MOTORS**

| HP | Make | Voltage | Speed | Type |
|---|---|---|---|---|
| 200 | West. | 2200 | 900 | |
| 150 | G.E. | 2200 | 900 | ATI |

Each of the above has a dir. con. exciter.

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Link Belt K 480 Diesel Dragline 2 yd. cap.
Buc.-Erie 42B steam shovel 1½ yds. cap.
Browning 10-12 ton truck crane on Mack truck
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P & H 650 Shovel and Crane
Buc. Erie GA-2 Shovel, gas
General ½ yd. Diesel Crane
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Lorain 45 Crane-Shovel, ¾ yd.
Conway Mucker "75", 36" gauge
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Buc. Erie 50B Steam Shovel 2 yds.
Marion Model 37 Steam Shovel, 1¾ yds.
Koehring 301, ¾ yd. Shovel & Crane
Buc. Erie Steam Dragline, 6-8 yds. 175' bm.
Ind. Brownhoist Crane, gas. 40' boom, 1 yd.
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Gyratory Crusher, Superior-McCully 30"
Gyratory Crusher, Traylor Type T, 12"
Mundy 35 H.P. double drum gas Hoist
National 100 H.P. dbl. drum Dragline Hoist, elec.
Baldwin 78 ton Side Tank Locomotive
American 45 ton Saddle Tank Switcher
Vulcan 30 ton Steam, std. gauge Saddle Tank loco.
Vulcan 25 ton Steam Loco. std. ga., side tank
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Vulcan 6 ton, 36" gauge, gas Locomotive
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Haiss Model 16 wagon loader Cat. type
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Trucks: Mack, Sterling, G.M.C. up to 12 yds.
Pumps—Gas, Electric, Steam, large stock
I. R. 1302 CFM., 2 stage Air Compressor
Bucket elevator, belt, 22", buckets, 35'
Haiss ¾ yd. Clam, rehandling Bucket
Erie ¾ yd. Clam, rehandling Bucket
Blaw-Knox ⅞ yd. Clam, digging Bucket
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P&H 700 shovel and crane 1½ yd. capacity
Cat. RD7 tractor with bulldozer
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3 Oshkosh tractor wagons 14 yd. capacity each

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**STEAM STRIPPING SHOVEL**

Boom 48 ft. Dipper Stick 36 ft. 2½ and 4 yds. Buckets. Excellent condition.
2—1 yard 07 Marion Steam Shovels.
1—Type A Erie Steam Shovel ⅝ yard Bucket.

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Vulcan 18-ton steam S/T locomotive, 42" gauge.
Davenport, Porter, Vulcan 18 to 20-ton steam 36" gauge S/T locomotives, (4), rebuilt, tested.
Porter 52-ton steam S/T locomotive, std. ga.
Plymouth and Milwaukee gas locomotives, 8, 12, 25, 35 tons: 36" & standard gauge, A-1.
Page #41 Diesel 2-yd. dragline, 65' boom.
Monighan Walker 3-yd. elec. dragline, 76' bm.
Bucyrus 50B, 80B steam, & 120B elec. shovels.
Euclid 6-yd. bottom dump crawler wagons (8).

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1—Flory Hoist 200 H.P. 440 volts, 60 cycles, air brakes, duty 12,000 lbs. @ 600 F.P.M.
2—Sullivan CR 2 shortwall machines 250 volts, DC. 50 H.P.
1—Sullivan CE 9 longwall machine 440 volts A.C.
3—Jeffrey 24 B longwall machines 250 volts D.C.

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and accessories

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36 x 36 Jeffrey Single Roll Coal Crusher
125 KW Ridgway 250 Volt Generator direct connected to Ridgway 4 Valve Engine

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6—50 H.P. Goodman Shortwall Mining Machines.
5—Goodman G-12½ Shaking Conveyors with troughing and all accessories, but without Duckbills.
2—Brown-Fayro Model HKL Car Spotting Hoists with motors.
2—Jeffrey 4-ton gathering locomotives with crab reels.
1—Jeffrey 10-ton Haulage Locomotive.
4—Jeffrey Aerodyne Blowers with tubing.
6—Jeffrey A-7 Coal Drills.

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**MOTOR GENERATOR SETS**

1—35 kw. 1150 rpm. 250 v. DC Gen. dir. conn. to 50 HP 240/480 v. 3 ph. 60 cy. 1200 rpm. Cr. Wh. Syn. Motor.
1—100 kw. 250/275 v. DC G.E. Gen. dir. driven thru coupling by 1—150 HP 2200 v. 900 rpm. G.E. Syn. Motor.
1—200 kw. West. 600 v. DC 900 rpm. Gen. direct driven through common shaft by 1—290 HP 440 v. 3 ph. 60 cy. West. Syn. Motor.

**ROTARY CONVERTERS**

3—150 kw. West. 3 ph. 60 cy. 275 v. 1200 rpm. Rotary Converters complete with transformers and switchboard.
3—300 kw. West. 3 ph. 60 cy. 600 v. 1200 rpm. Rotary Converters complete with transformers and switchboard.

**DIESEL ENGINE GENERATOR SET**

1—150 kw. 250 v. 200 rpm. cp. wd. Cr. Wh. Gen. dir. conn. to 260 HP 200 rpm. 2 cyl. Buckeye Diesel Engine.

**MINING MACHINES—250 v. DC**

1—CE-7 Sullivan 36" ga.
1—Armature for CE-7 Sullivan 250 v. DC.

**MINE LOCOMOTIVES**

3—5 ton Goodman 30 B. 250 v. 36" ga.
1—5 ton Goodman 2600R Gathering Locomotive, 250 v. DC 42 or 44" ga. with cable reel.
2—7 ton Goodman 32-0-4-T 250 v. 36" ga.
1—10 ton West. 500 v. 40" ga.
1—10 ton Goodman Locomotive, 250 v. 42" ga. cast iron frame, inside wheels.
1—13 ton Westinghouse 42" ga. 250 v. Locomotive, cast iron frame, two motor type, single end control.

**CENTRIFUGAL PUMPS**

1—1000 GPM Cameron bronze, 100' hd.
2—American Piston Pumps, intake 5½", discharge 4½", size 8x12.

**SLIPRING MOTORS—3 ph. 60 cy.**

| HP | Make | Type | Volts | RPM |
|---|---|---|---|---|
| 300 | G.E. | I | 440 | 900 |
| 260 | Burke | EMV-65 | 440 | 600 |
| 150 | West. | CW | 220/440 | 490 |
| 150/75 | West. | CW | 220/440/2200 | 580/290 |
| 100 | West. | CW | 220/440 | 685 |
| 75 | G.E. | I-M | 440 | 1200 |
| 75 | West. | CW | 220/440/2200 | 580/290 |
| 50 | Chand. | | 220/440 | 1800 |
| 50 | Allis Chal. | | 220 | 490 |
| 20 | Westg. | CW | 220 | 1735 |
| 15 | Westg. | CW | 220 | 870 |

**230 V. DC Motors**

| HP | Make | RPM | Type |
|---|---|---|---|
| ¾ | Cr. Wh. | 850 | EI |
| 1 | Louis Allis | 1150 | INA |
| 1½ | Westg. | 2200 | SK |
| 1½ | Westg. | 1000 | CD |
| 1½ | Westg. | 900 | SK |
| 1½ | Robbins Myers | 1750 | |
| 2 | Thompson | 1100 | |
| 2 | Northern | 1000 | |
| 4 | Westg. | 1180 | |
| 4 | Cr. Wh. | 1170 | CM |
| 5 | Cr. Wh. | 960 | CCM |
| 5 | Cr. Wh. | 980 | CM |
| 5 | Imperial | 540 | SK |
| 5 | Westg. | 850 | |
| 5 | Westg. | 1600 | RC |
| 7½ | Cr. Wh. | 875 | |
| 7½ | Cr. Wh. | 875 | |
| 7½ | Cr. Wh. | 940 | CCM |
| 10 | West. | 1325 | S |
| 10 | Cr. Wh. | 875 | |
| 10 | Cr. Wh. | 825 | CM |
| 10 | Cr. Wh. | 675 | CCM |
| 15 | G.E. | 850 | RC |
| 15½ | West. | 965 | S |
| 35 | G.E. | 900 | DLC |

**TRANSFORMERS—1 ph. 60 cy.**

| No. | Kva | Pri. | Sec. | Make |
|---|---|---|---|---|
| 1 | 2 | 6600 | 110/220 | G.E. |
| 3 | 5 | 2300 | 220/440 | G.E. |
| 1 | 5 | 550 | 110 | Pgh. |
| 1 | 5 | 2200 | 110/220 | West. |
| 84 | 7½ | 2200 | 220/110 | G.E. |
| 32 | 7½ | 2200 | 220/110 | West. |
| 12 | 10 | 2200 | 220/110 | West. |
| 13 | 10 | 2200 | 220/110 | G.E. |
| 2 | 15 | 400/30000/50000 | | American |
| 1 | 25 | 2200 | 220/110 | G.E. |
| 6 | 35 | 220 | 110 | West. |
| 3 | 37½ | 2200 | 440/220 | West. |
| 3 | 50 | 6600 | 575/440/220 | G.E. |
| 2 | 50 | 6600 | 550/440 | Pgh. |
| 2 | 50 | 6600 | 550/440 | Al. Ch. |
| 6 | 73 | 2200/4000 | 220/110 | West. |
| 6 | 73 | 440 | 205 | West. |
| 1 | 75 | 2200 | 220 | Burke |
| 6 | 75 | 2200 | 220/440 | West. |

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1—400 Amp. 275 volt, type CRL, serial No. 6327.
1—400 Amp. 275 volt, type ARL, serial No. 7530.
1—600 Amp. Class I, type AHD, 275 v. Ser. No. 8051.

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1—10 Ton GE steel frame, 250 v., H. M. 830-A motors.
1—8 Ton Jeffrey steel frame, 250 v.
1—8 Ton Goodman, steel frame, 250 v., type 3104-T, 42" track gauge.
1—6 Ton West, bar steel frame, with 904-C, 250 v. motors.
1—5 Ton GE ready to operate, 42" gauge.
2—5 Ton Goodman, 250 v., 36" gauge.
1—4 Ton Jeffrey MH 96, 250 v.

## COAL CUTTING MACHINES

1—124 EJ Goodman, 50 HP, 250 v., Permissible track mounted slabbing machine.
1—12 DA Goodman, 50 HP, 250 v., D.C.
1—12G3 Goodman shortwall, 3/60/220 v., AC.
1—12 AB Goodman shortwall, 250 v., D.C.
1—36 B Jeffrey, 250 v., longwall.

## MG SETS AND ROTARIES

1—100 KW Rotary Converter, 275 v., D.C.
1—165 HP G.E. Syn. 2200 v., 900 rpm motor, 100 KW 275 v. D.C.
1—300 KW G.E. MG set, 275 v., 3 ph, 60 cy, 2300 v., 1200 rpm.
1—150 KW G.E. type HCC form P, 275 v, Rotary Converter complete.

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10. Box, 36-Ft., 40-Ton
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4. Dump, Western, 20-Yd., 40 & 50-Ton
1. Dump, Koppel, Drop-Door; 20-Yd., 40-Ton
18. Dump, K & J Automatic, 16-Yd., 40-Ton
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500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V., Transformers.
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300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

## MOTOR GENERATORS

500 KW WEST. SYN. 275 V. 2300 V. 3 Ph., 60 Cy., 900 RPM, Manual Switchgear.
300 KW G.E. SYN. 275 V. 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.
200 KW G.E. IND., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.
200 KW R.W. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. 80% P.F. Manual Switchgear.

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10-T WESTGHE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHE., 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHE., 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHE., 500 V., 906-C Mts., 36"-44" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.
6-T WESTGE., 250 V., 904-C Mts., 36"-48" Ga.
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